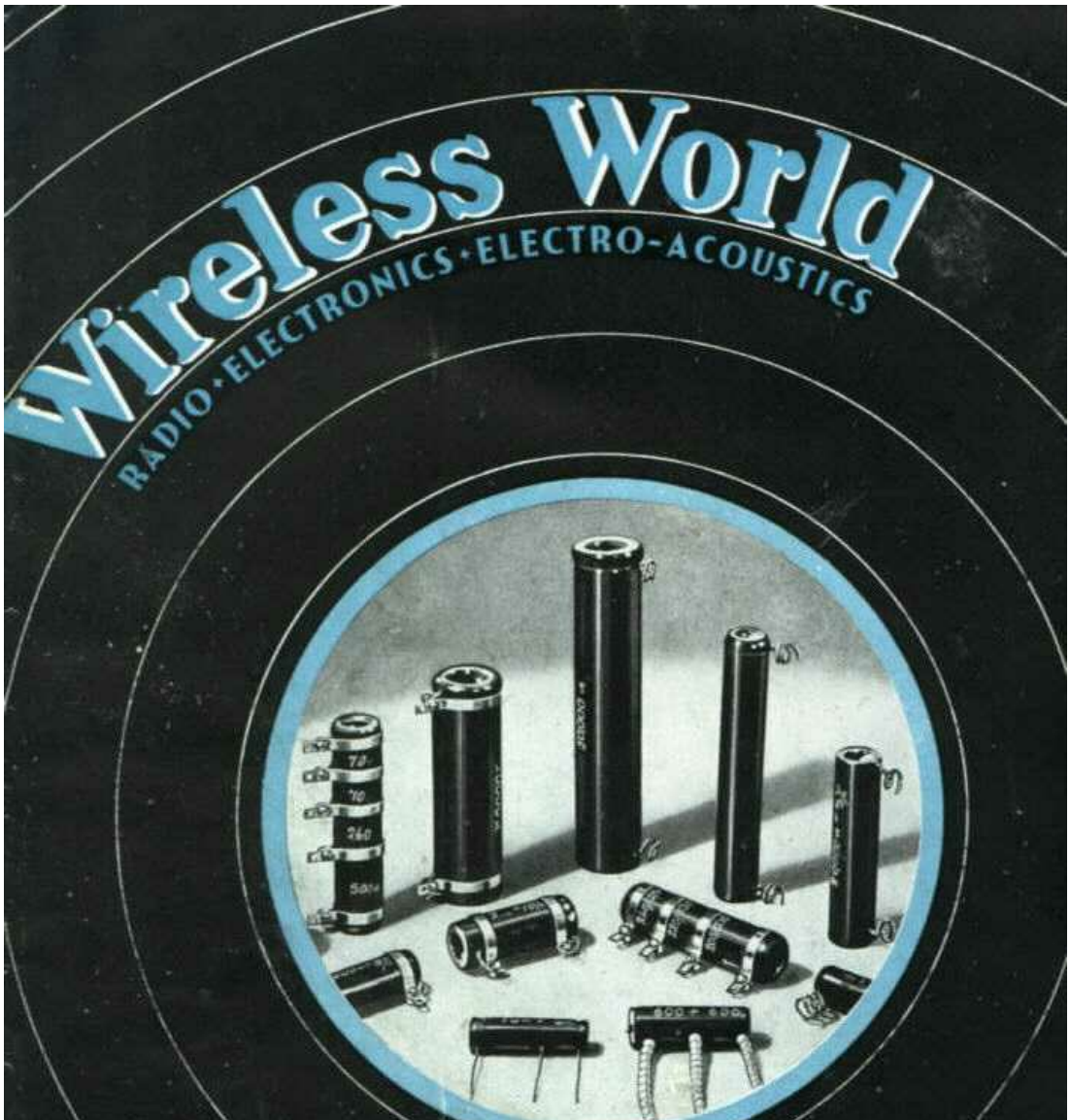
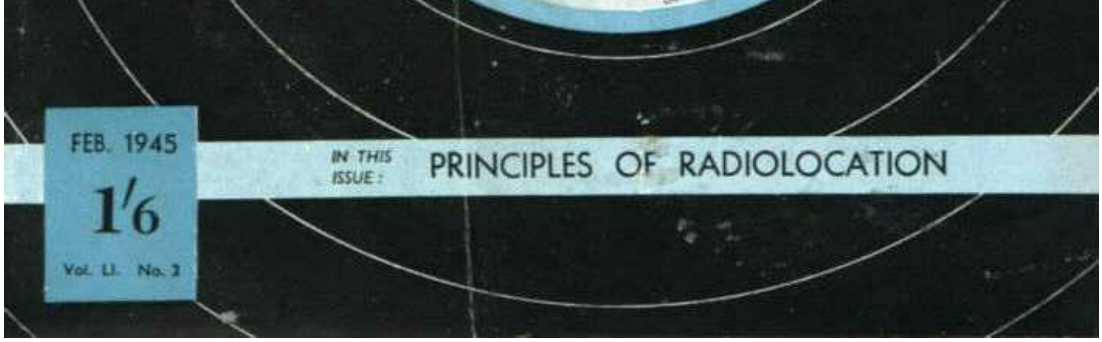
The History Of Science Fiction: Kepler, Newton, Arthur C. Clarke & Artificial Satellites

Sir Isaac Newton imagines a cannonball fired from a tall mountain. He equates this physical body with celestial bodies like the Moon in order to 'prove' that an apple falling here on Earth is equivalent to the Moon's assumed orbit around the Earth. Sir Isaac mathematically balances gravity, an accelerated phenomena (considered as velocity), with his concept of (an assumed) inertia which is defined as having a set, fixed and constant, velocity.

Despite what we have been told, it would seem Sir Isaac Newton's concept regarding orbital mechanics is flawed. See below for more, but the cannonball would be drawn further towards the center of the Earth with the passing of time, while its assumed inertia remains fixed at a constant velocity.





Einstein & Newton Both Made the Same Mistake:
They claim an accelerated velocity can be balanced by a (fixed) constant velocity. This is obviously, conceptually and logically flawed reasoning despite any mathematical model fudgery.

For example:
A is an apple that is magically growing without a tree. The Apple will never stop expanding and growing and taking on mass and weight. It gets heavier and heavier and over time will reach an unimaginable weight.

B is the table it rests on. The table can only hold 100 lbs before breaking.

At some point the Apple will gain too much weight and the table breaks.

Bad Einstein, Tricks Are For Kids

"Scientific misconduct is more prevalent than anyone would like to think. Some of the biggest names in science - Isaac Newton, Albert Einstein, Galileo Galilei - have been guilty of questionable behaviour. Einstein cherry-picked data and fudged proofs of E=mc2 (he never managed to prove it properly); in the Principia, Newton massaged his equations to fit with the latest data. And Galileo tried to convince the pope that the earth moved around the sun by "proving" that this was what caused the tides, when everyone knew even then that it was the moon."

http://www.newstatesman.com/scitech/2011/08/data-science-scientific

CLICK HERE FOR MORE ABOUT WHY EINSTEIN IS PROVEN WRONG WITH A COMPASS OR EVEN THE LIGHT PATH ITSELF (FOR EXAMPLE)

Imagined Experiments in Metaphysics

"Celestial mechanics is the branch of astronomy that deals with the motions of celestial objects. Historically, celestial mechanics applies principles of physics (classical mechanics) to astronomical objects, such as starsand planets, to produce ephemeris data. As an astronomical field of study, celestial mechanics includes the sub-fields of Orbital mechanics (astrodynamics), which deals with the orbit of an artificial satellite; and Lunar theory, which deals with the orbit of the Moon."

had predicted the world would end in the year 2060. "Sir Isaac Newton, Britain's greatest scientist, predicted the date of the end of the world — and it is only 57 years away."[722] Even the respectable science journal *Nature* repeated the claim. "Isaac Newton … predicted …

that science, along with everything else, will stop when the world ends in 2060."[723]

But reports in the popular press were mistaken. Newton was not so rash as to predict an exact date for the Apocalypse. The source of the *Daily Telegraph* story was Newton scholar Stephen D. Snobelen. According to Snobelen, Newton estimated the date of the Apocalypse to be between A.D. 2060 and 2344. Furthermore, this date range was not a firm conclusion on his part, but a "private musing" and an "ephemeral jotting on the back of a letter slip."[724] Newton considered specific date predictions to be rash. His prediction was "the period of 1260 days, if dated from the complete conquest of the three kings A.C. 800, will end A.C. 2060. It may end later, but I see no reason for its ending sooner. This I mention not to assert when the time of the end shall be, but to put a stop to the rash conjectures of fanciful men who are frequently predicting the time of the end, and by doing so bring the sacred prophecies into discredit as often as their predictions fail. Christ comes as a thief in the night, and it is not for us to know the times and seasons which God has put into his own breast."[725]

Science and Technology in World History, Volume 3: The Black Death, the ...By David Deming

The Trivium Method - not to be mistaken for the Classical Trivium - is a MENTAL ANTIVIRUS. In this interview, Jan adresses the in and outs of the Trivium and the Quadrivium as the 'Seven Liberal Arts' through the history of rise and fall of different peoples of the world up to this day.

THE MYTH of MODERN SCIENCE

"Much advance, both in biological evolution and in psychosocial evolution, including advance in science, is of course obtained by adding minute particulars, but at intervals something like crys- talization from a supersaturated solution occurs, as when science arrives at an entirely new concept, which then unifies an enor- mous amount of factual data and ideas, as with Newton or Darwin. Major advances occur in a series of large steps, from one form of organization to another. In our psychosocial evolution I believe we are now in a position to make a new major advance. " Sir Julian Huxley (1968)

Mythology: The Original Science Fiction

"Mythology is a collection of myths, especially one belonging to a particular sacred, religious or cultural tradition of a group of people. Myths are a collection of stories told to explain nature, history, and customs–or the study of such myths.

As a collection of such stories, mythology is a vital feature of every culture. Various origins for myths have been proposed, ranging from personification of nature, personification of natural phenomena to truthful or hyperbolic accounts of historical events, to explanations of existing ritual. Although the term is complicated by its implicit condescension, mythologizing is not just an ancient or primitive practice, as shown by contemporary mythopoeia such as urban legends and the expansive fictional mythoi created by fantasy novels and comics. A culture's collective mythology helps convey belonging, shared and religious experience, behavioural models, and moral and practical lessons.

The study of myth dates back to antiquity. Rival classifications of the Greek myths by Euhemerus, Plato's Phaedrus, and Sallustius were developed by the Neoplatonists and revived by Renaissance mythographers. Nineteenth-century comparative mythologyreinterpreted myth as a primitive and failed counterpart of science (E. B. Tylor), a "disease of language" (Max Müller), or a misinterpretation of magical ritual (James

Frazer).

Some recent approaches have rejected a conflict between the value of myth and rational thought, often viewing myths, rather than being merely inaccurate historical accounts, as expressions for understanding general psychological, cultural or societal truths."

CALCULUS MiSTAKE

*"The concept of **Derivative** is at the core of Calculus and modern mathematics. The definition of the derivative can be approached in two different ways. One is geometrical (as a slope of a curve) and the other one is physical (as a rate of change). Historically there was (and maybe still is) a fight between mathematicians which of the two illustrates the concept of the derivative best and which one is more useful. We will not dwell on this and will introduce both concepts. Our emphasis will be on the use of the derivative as a tool."*

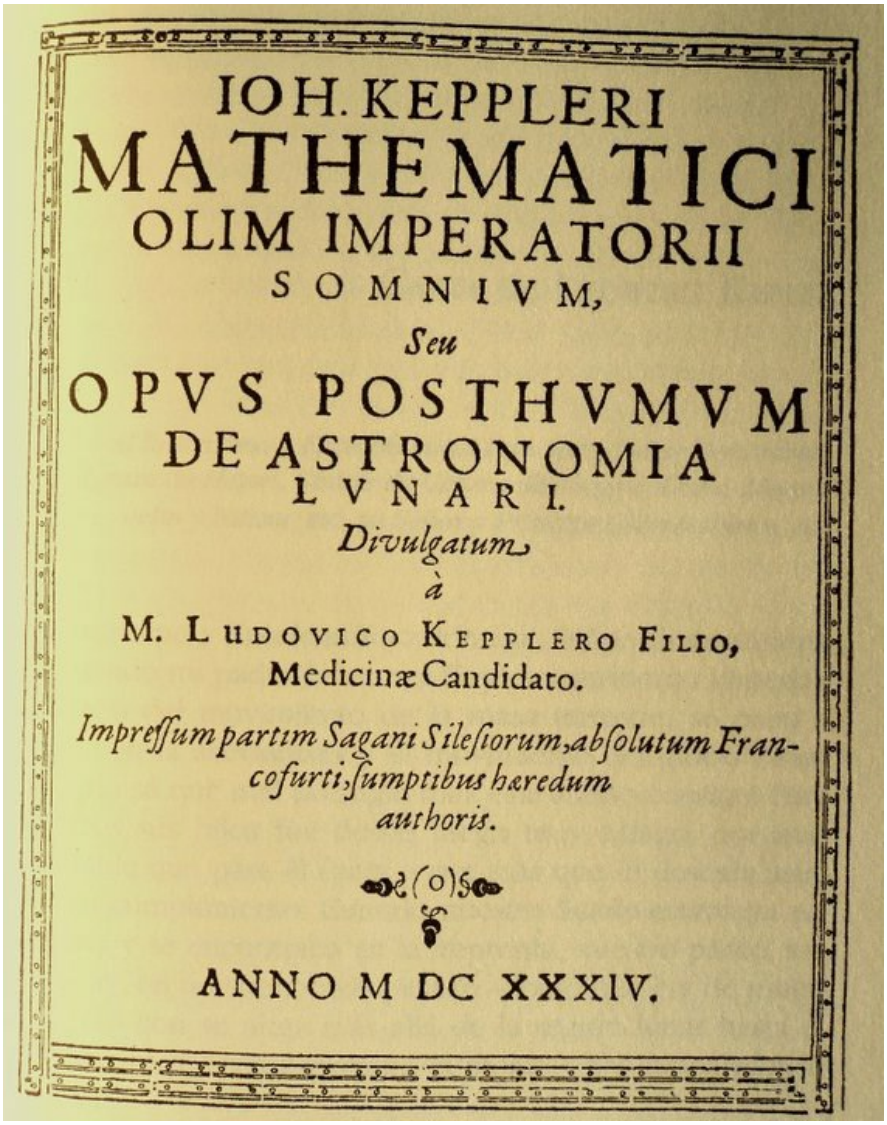
http://www.sosmath.com/calculus/diff/der00/der00.html

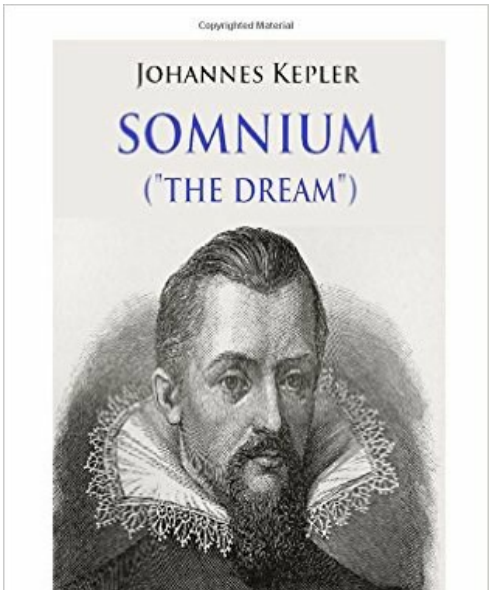
Sir Isaac Newton Assumes The Argonauts Myth as Historical Fact

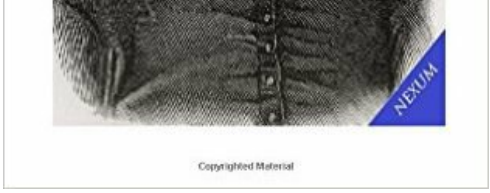
Sir Isaac Newton believed the mythological story of The Golden Fleece was a historical event and he related that supposed event to the precession of the equinoxes.

"Newton's interest in scientific chronology was initially sparked by the international discussion about setting the date of Easter and about the adoption of the Gregorian reform of the calendar. This was the subject of correspondence between Newton's great rival, Gottfried Wilhelm Leibniz, and the Royal Society in the early months of 1700. Many of Newton's contemporaries, notably John Graunt and Sir William Petty, were interested in using statistics to estimate the historical speed of population growth in a manner that might confirm the framework of biblical time. Happy to accept elements of the received chronology of the Hebrew Bible, Newton desired to regulate information provided by ancient dynasty lists, which appeared to describe a succession of generations. Rather than consider whether there had been enough time to people the earth, he tried to calculate how much time, on average, would be needed for the orderly succession of a given number of named rulers. He was less careful than some of his contemporaries in his analysis of textual evidence. The extreme antiquity of the Egyptian dynasties presented a problem, which Newton solved by adopting the identification made by Sir John Marsham in the early 1670s between the historical king Sesostris and the biblical pharaoh Sesac. For proof of the radical shortening of secular history that this move implied, and to make it conform with the chronology of the ancient Greeks that he proposed, Newton eventually looked to astronomy. ***He hoped to use the periodicity provided by the precession of the equinoxes to date historical observations of the heavens, reported in the fourth century BC by Eudoxus, in order to control the earliest dates in Greek history. These he associated with the expedition of the Argonauts (which he believed to be historical fact),*** *the Trojan War, and the writings of Hesiod. In reworking data that he took from the Hellenistic Commentary of Hipparchus, Newton sought to identify historical "colures". A colure is the meridian that passes through the poles of the celestial sphere and cuts the sun's apparent path through the heavens at the points that it has reached at the solstices (or, alternatively, at the equinoxes). The region of the heavens identified by such a colure shifted over time due to the precession of the equinoxes and thus its description could in theory generate precise dates."*

source: http://www.the-tls.co.uk/tls/public/article1365793.ece

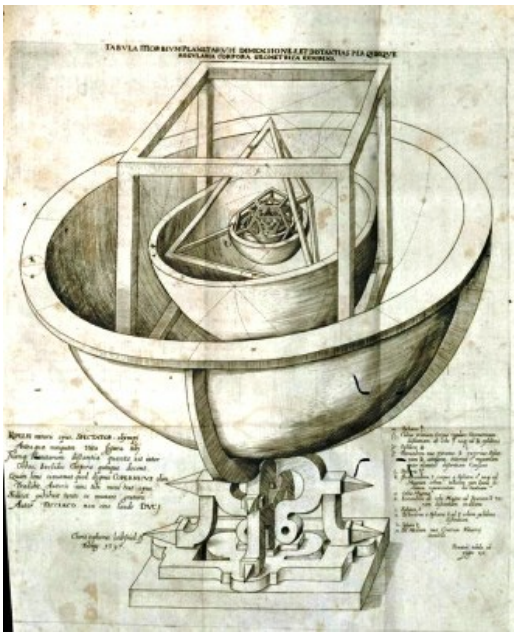

IOH. KEPPLERI
MATHEMATICI
OLIM IMPERATORII
SOMNIVM,
Seu
OPVS POSTHVMVM
DE ASTRONOMIA
LVNARI.
Divulgatum
à
M. LUDOVICO KEPPLERO FILIO,
Medicinæ Candidato.
Impressum partim Sagani Silesiorum, absolutum Francofurti, sumptibus hæredum authoris.
ANNO M DC XXXIV.





Somnium

"(Latin for *"The Dream"*) was a science fiction novel written in 1608, in Latin, by Johannes Kepler. The narrative would not be published until 1634 by Kepler's son, Ludwig Kepler. In the narrative, an Icelandic boy and his witch mother learn of an island named Levania (our Moon) from a daemon (demon). Somnium presents a detailed imaginative description of how the Earth might look when viewed from the Moon, and is considered the first serious scientific treatise on lunar astronomy. Carl Sagan and Isaac Asimov have referred to it as the first work of science fiction."



"The story begins with Kepler reading about a skillful magician named Libussa. He falls asleep while reading about her. He recounts a strange dream he had from reading that book. The dream begins with Kepler reading a book about Duracotus, an Icelandic boy who is 14 years old. Duracotus' mother, Fiolxhilde, makes a living selling bags of herbs and cloth with strange markings on them. Duracotus is sold by Fiolxhilde to a skipper after cutting into one of these bags and ruining her sale. He travels with the skipper for a while until a letter is to be delivered to Tycho Brahe on the island of Hven (now Ven, Sweden). Since Duracotus is made seasick by the trip there, the skipper leaves Duracotus to deliver the letter and stay with Tycho.

Tycho asks his students to teach Duracotus Danish so they can talk. Along with learning Danish, Duracotus learns of astronomy from Tycho and his students. Duracotus is fascinated with astronomy and enjoys the time they spend looking at the night sky. Duracotus spends several years with Tycho before returning home to Iceland.

Upon his return to Iceland, Duracotus finds his mother still alive. She is overjoyed to learn that he is well studied in astronomy as she too possesses knowledge of astronomy. One day, Fiolxhilde reveals to Duracotus how she learned of the heavens. She tells him about the daemons she can summon. These daemons can move her anywhere on Earth in an instant. If the place is too far away for them to take her, they describe it in great detail. She then summons her favorite daemon to speak with them.

The summoned daemon tells them, "Fifty thousand miles up in the Aether lies the island of Levania." which is Earth's moon.[2] According to the daemon, there is a pathway between the island of Levania and Earth. When the pathway is open, daemons can take humans to the island in four hours. The journey is a shock to humans, so they are sedated for the trip. Extreme cold is also a concern on the trip, but the daemons use their powers to ward it off. Another concern is the air, so humans have to have damp sponges placed in their nostrils in order to breathe. The trip is made with the daemons pushing the humans toward Levania with great force. At the Lagrangian point between the Earth and the Moon,[3] the daemons have to slow the humans down lest they hurtle with great force into the moon.

After describing the trip to Levania, the daemon notes that daemons are overpowered by the Sun. They dwell in the shadows of the Earth, called Volva by the inhabitants of Levania. The daemons can rush to Volva during a solar eclipse, otherwise they remain hidden in shadows on Levania.

After the daemon describes other daemons' behavior, she goes on to describe Levania. Levania is divided into two hemispheres called Privolva and Subvolva. The two hemispheres are divided by the divisor. Privolva never sees Earth (Volva), Subvolva sees Volva as their moon. Volva goes throughout the same phases as the actual moon.

The daemon continues the descriptions of Subvolva and Privolva. Some of these details are scientific in nature such as: how eclipses would look from the Moon, the size of the planets varying in size due to the moons distance from the Earth, an idea about the size of the Moon and more. Some details of Levania are science fiction such as: descriptions of the creatures that inhabit Subvolva and Privolva, plant growth on each side, and the life and death cycle of Levania.

The dream is cut short in the middle of the description of the creatures of Privolva. Kepler wakes up from the dream because of a storm outside. He then realizes that his head is covered and he is wrapped in blankets just like the characters in his story"

This early silent film was created/directed by Georges Méliès and was released in France under the name, "La lune à un mètre," in 1898. In the film an astronomer is studying at his desk in an observatory. The devil appears, then a woman appears and makes the devil and herself vanish.

See video above, description below. Please note similarity to the Kepler's story, "Somnium".

"This early silent film was created/directed by Georges Méliès and was released in France under the name, "La lune à un mètre," in 1898.

In the film an astronomer is studying at his desk in an observatory. The devil appears, then a woman appears and makes the devil and herself vanish. The astronomer draws a globe on a blackboard which comes to life and starts to move on the blackboard. The astronomer then looks through a small telescope.

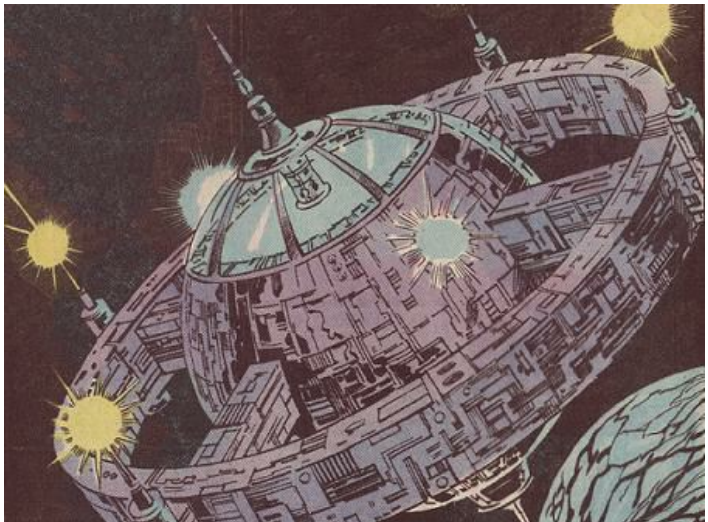
The moon appears as a large face and eats the astronomer's telescope. Men tumble from its mouth. Then the moon is back in the sky. The astronomer stands on a table, which disappears and he falls down.

The moon becomes a crescent. A spirit, in the form of a lady, appears from it. The astronomer chases her, but she eludes him. Now another figure stands in the crescent of the moon, before reclining into its C shape.

The moon appears as a large face again, and the astronomer jumps into its mouth and a woman and the devil appear again. The astronomer reappears sitting asleep in his chair."

"Marie-Georges-Jean Méliès, known as **Georges Méliès** was a French illusionist and filmmaker famous for leading many technical and narrative developments in the earliest days of cinema. Méliès, a prolific innovator in the use of special effects, accidentally discovered the substitution stop trick in 1896, and was one of the first filmmakers to use multiple exposures, time-lapse photography, dissolves, and hand-painted color in his work. Because of his ability to seemingly manipulate and transform reality through cinematography, Méliès is sometimes referred to as the first "Cinemagician".[2] His films include *A Trip to the Moon* (1902) and *The Impossible Voyage* (1904), both involving strange, surreal journeys somewhat in the style of Jules Verne, and are considered among the most important early science fiction films, though their approach is closer to fantasy. Méliès was also an early pioneer of horror cinema, which can be traced back to his *The Haunted Castle* (1896)."

Paul Morton's Weird and Wonderful World of Early Cinema (2009)



Satellite

1540s, "follower or attendant of a superior person," from Middle French *satellite* (14c.), from Latin *satellitem* (nominative *satelles*) "attendant, companion, courtier, accomplice, assistant," perhaps from Etruscan *satnal* (Klein), or a compound of roots **satro-* "full, enough" + **leit-* "to go" (Tucker); compare English follow, which is constructed of similar roots.

Meaning "planet that revolves about a larger one" first attested 1660s, in reference to the moons of Jupiter, from Latin *satellites*, which was used in this sense 1610s by German astronomer Johannes Kepler (1571-1630). Galileo, who had discovered them, called them *Sidera Medicæa* in honor of the Medici family. Meaning "man-made machinery orbiting the Earth" first recorded 1936 as theory, 1957 as fact. Meaning "country dependent and subservient to another" is recorded from 1800.

A Famed Thought Experiment

"The Buridan impetus theory developed one of the most important thought-experiments in the history of science, namely the so-called 'tunnel-experiment', so important because it brought oscillatory and pendulum motion within the pale of dynamical analysis and understanding in the science of motion for the very first time and thereby also established one of the important principles of classical mechanics. The pendulum was to play a crucially important role in the development of mechanics in the 17th century, and so more generally was the axiomatic principle of Galilean, Huygenian and Leibnizian dynamics to which the tunnel experiment also gave rise, namely that a body rises to the same height from which it has fallen, a principle of gravitational potential energy. As Galileo Galilei expressed this fundamental principle of his dynamics in his 1632 Dialogo:

> *The heavy falling body acquires sufficient impetus [in falling from a given height] to carry it back to an equal height.*

This imaginary experiment predicted that a cannonball dropped down a tunnel going straight through the centre of the Earth and out the other side would go past the centre and rise on the opposite surface to the same height from which it had first fallen on the other side, driven upwards past the centre by the gravitationally created impetus it had continually accumulated in falling downwards to the centre. This impetus would require a violent motion correspondingly rising to the same height past the centre for the now opposing force of gravity to destroy it all in the same distance which it had previously required to create it, and whereupon at this turning point the ball would then descend again and oscillate back and forth between the two opposing surfaces about the centre ad infinitum in principle. Thus the tunnel experiment provided the first dynamical model of oscillatory motion, albeit a purely imaginary one in the first instance, and specifically in terms of A-B impetus dynamics.

However, this thought-experiment was then most cunningly applied to the dynamical explanation of a real world oscillatory motion, namely that of the pendulum, as follows. The oscillating motion of the cannonball was dynamically assimilated to that of a pendulum bob by **imagining it to be attached to the end of an immensely cosmologically long cord suspended from the vault of the fixed stars centred on the Earth***, whereby the relatively short arc of its path through the enormously distant Earth was practically a straight line along the tunnel. Real world pendula were then conceived of as just micro versions of this 'tunnel pendulum', the macro-cosmological paradigmatic dynamical model of the pendulum, but just with far shorter cords and with their bobs oscillating above the Earth's surface in arcs corresponding to the tunnel inasmuch as their oscillatory midpoint was dynamically assimilated to the centre of the tunnel as the centre of the Earth.*

CONTROVERSY!

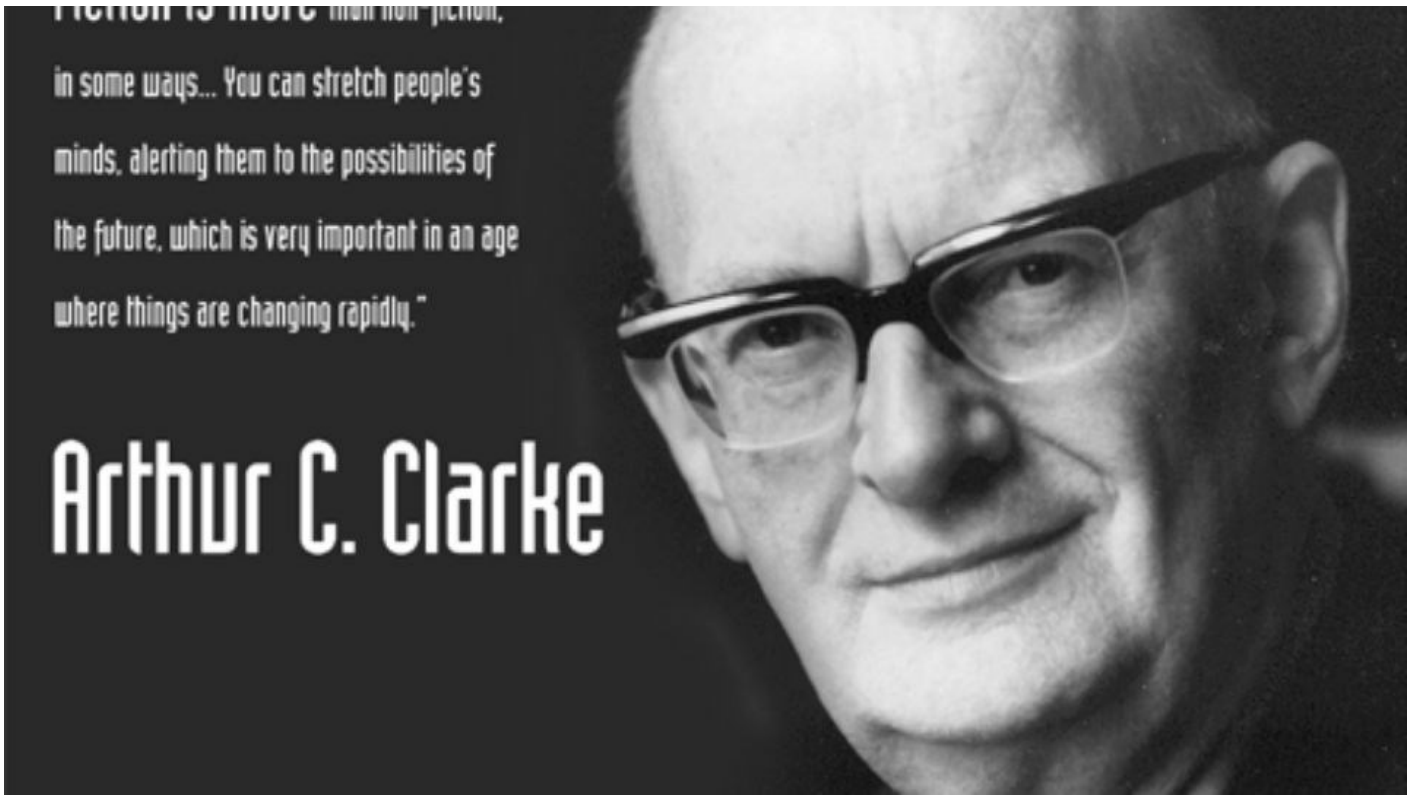
"Emulating the rationalistic style of Thomas Aquinas, ***Tolosani sought to refute Copernicanism by philosophical argument. Copernicanism was absurd, according to Tolosani, because it was scientifically unproven and unfounded. First, Copernicus had assumed the motion of the Earth but offered no physical theory whereby one would deduce this motion.*** (No one realized that the investigation into Copernicanism would result in a rethinking of the entire field of physics.) Second, **Tolosani charged that Copernicus' thought process was backwards. He held that Copernicus had come up with his idea and then sought phenomena that would support it, rather than observing phenomena and deducing from them the idea of what caused them. In this, Tolosani was linking Copernicus' mathematical equations with the practices of the Pythagoreans** (whom Aristotle had made arguments against, which were later picked up by Thomas Aquinas). It was argued that mathematical numbers were a mere product of the intellect without any physical reality, and as such could not provide physical causes in the investigation of nature.[92]

Some astronomical hypotheses at the time (such as epicycles and eccentrics) were seen as mere mathematical devices to adjust calculations of where the heavenly bodies would appear, rather than an explanation of the cause of those motions. (As Copernicus still maintained the idea of perfectly spherical orbits, he relied on epicycles.) This "saving the phenomena" was seen as proof that astronomy and mathematics could not be taken as serious means to determine physical causes. Tolosani invoked this view in his final critique of Copernicus, saying that his biggest error was that he had started with "inferior" fields of science to make pronouncements about "superior" fields. Copernicus had used mathematics and astronomy to postulate about physics and cosmology, rather than beginning with the accepted principles of physics and cosmology to determine things about astronomy and mathematics. Thus Copernicus seemed to be undermining the whole system of the philosophy of science at the time. **Tolosani held that Copernicus had fallen into philosophical error because he had not been versed in physics and logic; anyone without such knowledge would make a poor astronomer and be unable to distinguish truth from falsehood."**

https://en.wikipedia.org/wiki/Nicolaus_Copernicus#Controversy

"Ingoli presented five physical arguments against the theory, thirteen mathematical arguments (plus a separate discussion of the sizes of stars), and four theological arguments. The physical and mathematical arguments were of uneven quality, but many of them came directly from the writings of Tycho Brahe, and Ingoli repeatedly cited Brahe, the leading astronomer of the era. **These included arguments about the effect of a moving earth on the trajectory of projectiles, and about parallax and Brahe's argument that the Copernican theory required that stars be absurdly large.**"

***Centered on The Earth*: THE VAULT OF FIXED STARS A SPACE Odyssey**



https://en.wikipedia.org/wiki/Arthur_C._Clarke

Letters to the Editor

Peacetime Uses for V2 • FM Protection Against High-Amplitude Interference Pulses • Bad Books

V2 for Ionosphere Research?

ONE of the most important branches of radio physics is ionospheric research and until now all our knowledge of conditions in the ionosphere has been deduced from transmission and echo experiments. One of the more modest claims of the British Interplanetary Society was that rockets could be used for very high altitude investigations and it will not have escaped your readers' notice that the German long-range rocket projectile known as V2 passes through the E layer on its way from the Continent. If it were fired vertically without westward deviation it could reach the F_1 and probably the F_2 layer.

The implications of this are obvious: we can now send instruments of all kinds into the ionosphere and by transmitting their readings back to ground stations obtain information which could not possibly be learned in any other way. Since the weight of

limits of the atmosphere and broadcasting information as long as the batteries lasted. Since the rocket would be in brilliant sunlight for half the time, the operating period might be indefinitely prolonged by the use of thermocouples and photo-electric elements.

Both of these developments demand nothing new in the way of technical resources; the first and probably the second should come within the next five or ten years. However, I would like to close by mentioning a possibility of the more remote future—perhaps half a century ahead.

An "artificial satellite" at the correct distance from the earth would make one revolution every 24 hours; i.e., it would remain stationary above the same spot and would be within optical range of nearly half the earth's surface. Three repeater stations, 120 degrees apart in the correct orbit, could give television and micro-

the FM receiver gives no output from impulsive interference.

(2) In the presence of an unmodulated carrier to which the FM receiver is accurately tuned, the impulsive interference causes no audible output. If the receiver is not accurately tuned, there will be an audible output, but the amplitude of the pulses in the audio-frequency circuits of the receiver will correspond to a modulation of the carrier of less than 100 per cent., in fact to a modulation depth equal to the ratio of the frequency error in tuning to the frequency swing corresponding to full modulation of a frequency-modulated signal.

(3) In the presence of a frequency-modulated signal to which the receiver is accurately tuned, the audio-frequency noise pulses are limited to the *instantaneous* level of signal modulation. If the receiver is not accurately tuned, the amplitude of the audio-frequency pulses

instruments would only be a few pounds—as compared with V2's payload of 2,000 pounds—the rocket required would be quite a small one. Its probable take-off weight would be one or two tons, most of this being relatively cheap alcohol and liquid oxygen. A parachute device (besides being appreciated by the public!) would enable the rocket to be re-used.

This is an immediate post-war research project, but an even more interesting one lies a little farther ahead. A rocket which can reach a speed of 8 km/sec parallel to the earth's surface would continue to circle it for ever in a closed orbit; it would become an "artificial satellite." V2 can only reach a third of this speed under the most favourable conditions, but if its payload consisted of a small one-ton rocket, this upper component could reach the required velocity with a payload of about 100 pounds. It would thus be possible to have a hundredweight of instruments circling the earth perpetually outside the wave coverage to the entire planet. I'm afraid this isn't going to be of the slightest use to our post-war planners, but I think it is the *ultimate* solution to the problem.

ARTHUR C. CLARKE,
British Interplanetary Society.

Frequency Modulation

WHILE post-war plans for television and UHF sound broadcasting are under discussion, it is important that the pros and cons of FM should be understood. Space will not permit a full discussion here; but I wish to correct a misconception, found even among responsible engineers, that FM can give no protection against ignition noise or other similar pulses which have an amplitude much greater than that of the signal carrier. The actual response of an FM receiver to very powerful impulsive interference can be summarised as follows:—

(1) In the absence of a signal, will be increased by the amount defined in (2) above.

If it is true, as sometimes suggested, that ignition noise is the chief trouble in UHF broadcasting, this summary provides a basis for the comparison of FM with other systems, such as wideband AM with audio-frequency limiting.

D. A. BELL.

London, N.21.

"New Thoughts on Contrast Expansion"

EXPEDIENCY be damned. My condemnation of contrast expansion was not based upon noise and neighbour tolerances. John B. Rudkin (your January issue) says "condemn the Philadelphia Orchestra because it is too large to play in the village hall." The truth is that anyone who asks it to do so should be condemned, and those who try to get the B.B.C. Orchestra into their bedroom are committing a crime. If the room is small, acoustically small, then only a limited contrast is proper, and all music

Good Whisky—JOHNNIE WALKER

BLACK-OUT ZERO HOUR TO-NIGHT UNTIL 5.37 A.M.

Daily Express

No. 12,562 Tuesday, August 27, 1940 One Penny

H-P SAUCE IMPROVES TASTE STOPS WASTE

Searchlights and guns chase raiders on 'circular tour' of the Capital

LONDON HAS 6-HOUR RAIDS

Britain built last week

MORE PLANES THAN EVER

LORD BEAVERBROOK, THE MINISTER OF AIRCRAFT PRODUCTION, ISSUED THE FOLLOWING ANNOUNCEMENT LAST NIGHT:—

"Many are they that rise against us.

"But the men and women of the aircraft industry of Britain answer the challenge.

"These brave defenders of the liberties of Britain, ignoring air raids and indifferent to enemy attacks, have provided for the R.A.F. in the last week more fighters and more bombers than ever before in the history of aviation.

"Supported by the alloy workers in steel and aluminium, by the drop stampers and the forgers, and by all those who labour in the fabrication of their raw materials, they have given us a record week of production.

"The blessing of the nation is upon these people."

SOME BOMBS DROPPED

Troops, police, Home Guards hunt for parachutists

LONDON had its longest raid warning of the war during the

EIRE BOMBED

3 KILLED

Daily Express Staff Reporter

DUBLIN, Monday.—Eire was bombed today for the first time in the war, a German raider

5 a.m. EDITION

BOMBER SHOT DOWN

HUNT FOR ESCAPED GERMANS

PLANES IN RELAYS

RAIDERS SWOOP ON FOLKESTONE

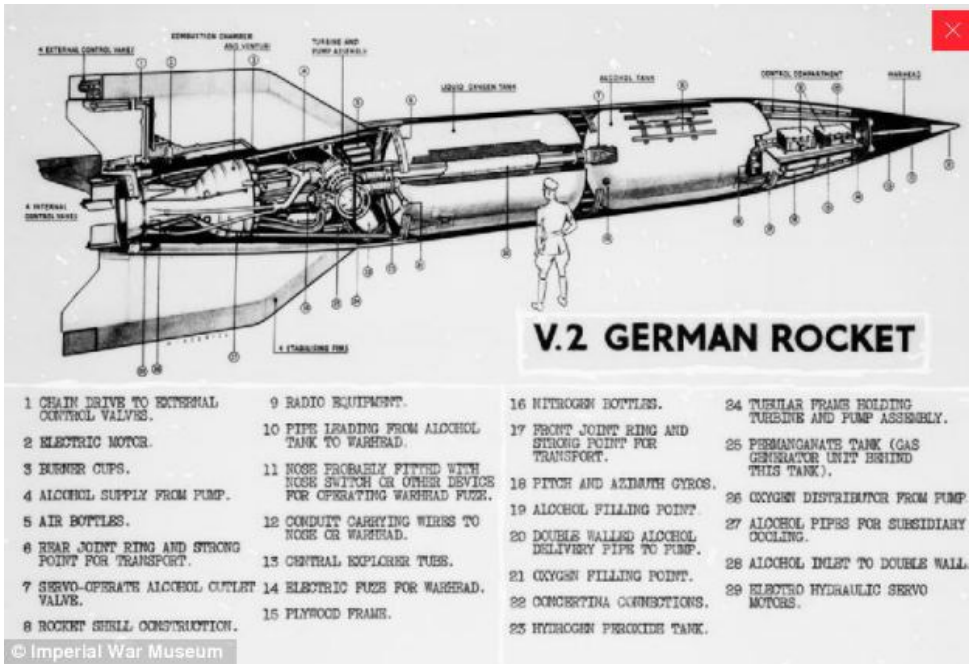
—YOU see the bombs exploding in the picture above. The German raiders dived out of a formation of about twenty planes yesterday. Folkestone streets were machine-gunned. Several houses near the seafront were razed. Three people were killed in a bungalow.—The story is told on the Back Page.

500 saving certificates

"**Wernher Magnus Maximilian, Freiherr von Braun** (March 23, 1912 – June 16, 1977) was a German (and later American) aerospace engineer[2] and space architect credited with inventing the V-2 Rocket and the Saturn V, for Nazi Germany and the United States, respectively.[3][4] He was one of the leading figures in the development of rocket technology in Nazi Germany, where he was a member of the Nazi Party and the SS. Following World War II he, as well as about 1500 other scientists, technicians, and engineers, were moved to the United States as part of Operation Paperclip, where he developed the rockets that launched America's first space satellite and first series of moon missions.

In his twenties and early thirties, von Braun worked in Germany's rocket development program, where he helped design and develop the V-2 at Peenemünde during World War II. Following the war, Von Braun worked for the United States Army on an intermediate-range ballistic missile (IRBM) program before his group was assimilated into NASA. Under NASA, he served as director of the newly formed Marshall Space Flight Center and as the chief architect of the Saturn V launch vehicle, the superbooster that propelled the Apollo spacecraft to the Moon.[5] According to NASA, he is, "without doubt, the greatest rocket scientist in history", as well as the "Father of Rocket Science".[*citation needed*][6] In 1975 he received the National Medal of Science. He continued insisting on the human mission to Mars throughout his life."

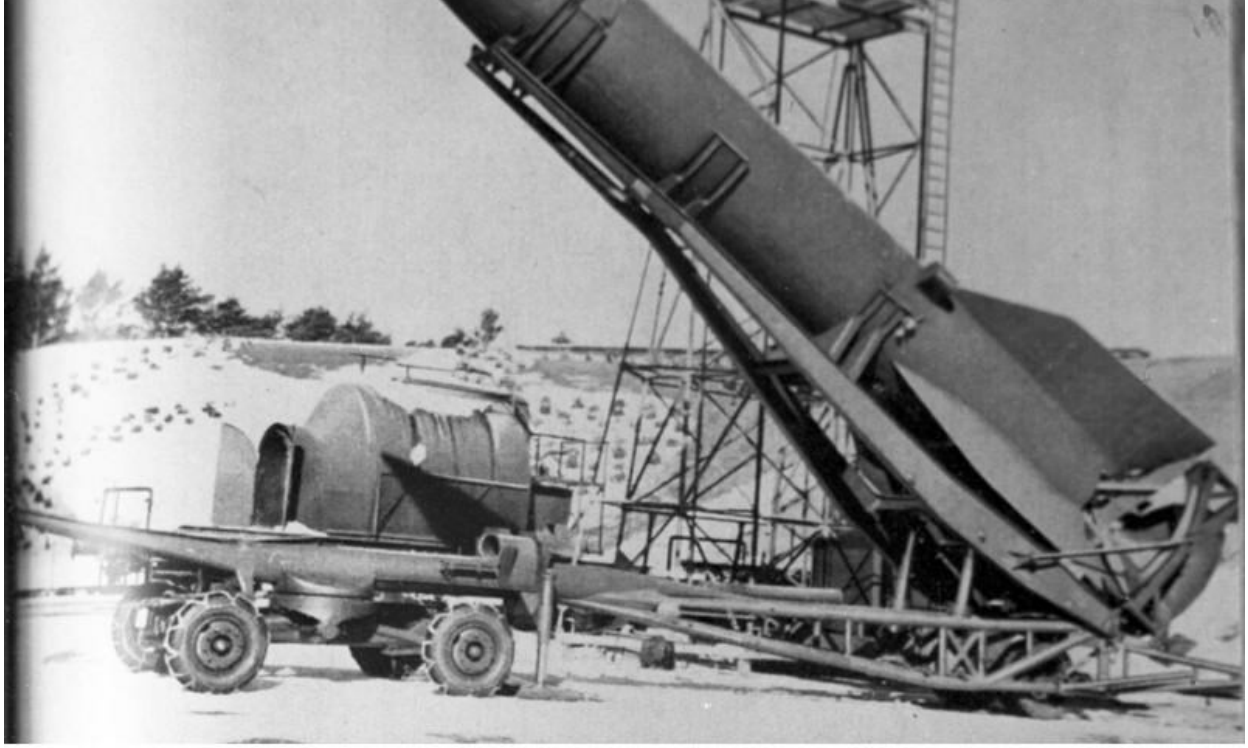
https://en.wikipedia.org/wiki/Wernher_von_Braun



"The **V-2** (German: *Vergeltungswaffe 2*, "Retribution Weapon 2"), technical name ***Aggregat-4*** (*A-4*), was the world's first long-range[4] guided ballistic missile. The missile with liquid-propellant rocket engine was developed during the Second World War in Germany as a "vengeance weapon", designed to attack Allied cities as retaliation for the Allied bombings against German cities. The V-2 rocket was also the first artificial object to cross the boundary of space.

Beginning in September 1944, over 3,000 V-2s were launched by the German Wehrmacht against Allied targets during the war, first London and later Antwerp and Liège. According to a 2011 BBC documentary, the attacks resulted in the deaths of an estimated 9,000 civilians and military personnel, while 12,000 forced laborers and concentration camp prisoners were killed producing the weapons."

https://en.wikipedia.org/wiki/V-2_rocket



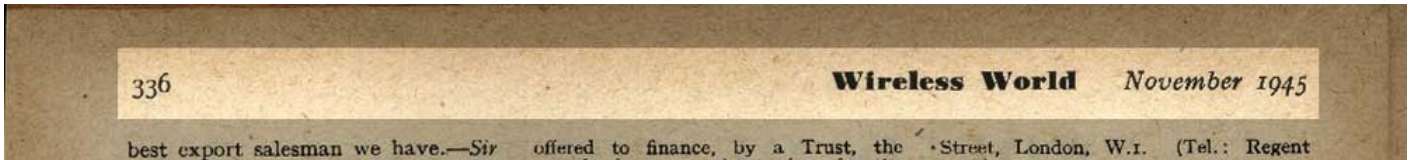
Bundesarchiv, Bild 141-1875A
Foto: o.Ang. | 1942/1945 ca.

Fritz Lang film, "*Frau im Mond" or* "Women in The Moon", clip below:

"Since rocket scientist Hermann Oberth worked as an advisor on this movie - he had originally intended to build a working rocket for use in the film, but time and technology prevented this from happening. It was popular among the rocket scientists in Wernher von Braun's circle at the Verein für Raumschiffahrt (VfR). The first successfully launched V-2 rocket at the rocket-development facility in Peenemünde had the ***Frau im Mond*** *logo painted on its base.[5] Noted post-war science writer Willy Ley also served as a consultant on the film. Thomas Pynchon's Gravity's Rainbow, which deals with the V-2 rockets, refers to the movie, along with several other classic German silent films."*

Frau in Mond

London damaged by German war effort, World War Two, photo below:



Thomas Polson, K.B.E., C.M.G., Chairman of Pye, Ltd.

PIT OR STALLS?—I anticipate that in time you will be offered two standards of B.B.C. television transmission, the utility 405-line picture, giving you a seat in the pit, and the luxury 1,000-line definition, putting you in the front row of the television stalls.—*Howard Thomas in "Sunday Graphic and Sunday News."*

PERSONALITIES

Carleton Dyer has been appointed Controller of Communication Equipment in the Ministry of Aircraft Production in succession to Sir Robert Renwick, who has resigned on his return to industry.

Roy Innes is the new General Secretary of the Association of Scientific Workers, the membership of which has now reached 17,000.

G. J. Redfern has joined Banks (London), Ltd., as Chief Electronic Engineer and will handle the technical side of the Company's business.

Dr. J. M. DODDS, head of the radio research section of Metropolitan Vickers, who were responsible for the transmitters of the original "CH" radar stations. He, and L. H. Bedford (see col. 3) of Cossor's, were the first industrial engineers to be taken fully into the confidence of the Government on radar.

IN BRIEF

Servicing Exam.—The results of the second examination for the Radio Servicing Certificate, held in London, Manchester and Glasgow on June 2nd under the auspices of the Radio Trades Examination Board, have been announced. Of the 56 entrants 24 passed both the written and practical parts of the examination. Twelve candidates passed only the written examination, of whom six re-entered for the practical test; four passed.

Dr. Partridge Memorial.—Just prior to his death, as a result of enemy action last year, Dr. Norman Partridge award of an annual premium for the most outstanding paper on "Improvements in the Quality of Sound Reproduction" read before the British Institution of Radio Engineers in any one year. It has now been decided to establish a Dr. Norman Partridge Memorial Fund for this purpose and the first premium will be awarded in 1946. The Fund has already been well supported by Institution members.

Antarctic Radar.—The fitting of radar on the first of the large whale-factory ships, *Southern Venture*, for protection against icebergs on her voyage to the Antarctic is a revival of the earliest maritime application of radiolocation.

Television in Argentina.—An order has been placed for the erection of the first television transmitter in South America. The installation is to be carried out by Allen B. DuMont Laboratories, New York, and the site is expected to be in or near Buenos Aires.

Electronic Astronomy.—Some interesting applications of electronic technique to astronomy are given in a paper in the *Journal of the British Astronomical Association*, communicated by Arthur C. Clarke, who wrote recently in this journal on "Extra-Terrestrial Relays." Among the subjects dealt with are the use of photocell circuits to provide automatic following for stellar photography, television scanning methods of star counting and the possibility of using radar technique for the precise measurement of interplanetary distances.

Romford Radio Society has been reformed and regular meetings have commenced. A fitted workshop is planned in the new headquarters to which they will shortly be moving. Particulars are obtainable from the Hon. Sec., R. C. E. Beardow (G3FT), 3, Geneva Gardens, Whalebone Lane North, Chadwell Heath, Essex.

"EI" Amateurs.—Ireland's fifty-three pre-war amateur transmitters are now permitted to operate. The Minister of Defence has revoked the Order, which has been operating since 1939, prohibiting transmission.

Scientific Films.—A revised catalogue of scientific films showing the suitability of films for various types of audience is now available from the Association of Scientific Workers, Hanover House, 73, High Holborn, London, W.C.1, price 2s. 6d.

Uruguay Broadcasting.—Marconi's W.T. Co. is to erect a 5-kW medium-wave transmitter at Montevideo for "Radio Rural." It will operate on a wavelength of 492 metres.

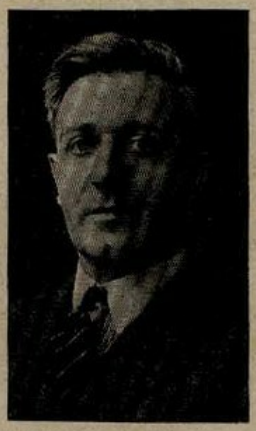
Gauge and Toolmakers' Exhibition.—An exhibition has been arranged by the Gauge and Tool Makers' Association to be held in the New Hall, Vincent Square, London, S.W.1, from January 7th to 19th, 1946.

More Radio Receivers.—A large factory at Crewe Toll, Edinburgh, has been allocated to Ferranti by the Board of Trade for the production of civilian radio receivers.

Change of Address.—The new address of the Import Licensing Department of the Board of Trade is 189, Regent 4090.)

A New Factory at Birtley, Co. Durham, has been acquired by W. T. Henley's Telegraph Works Company, for cable manufacture. This is in addition to their existing factories at Gravesend and Woolwich.

Plastics. — The manufacture of "Traffolyte" laminated plastics, formerly a product of Metropolitan Vickers, has been taken over by De La Rue Insulation, Ltd.



L. H. BEDFORD, Director of Research, of Cossor's, makers of the receiving equipment for the pre-war radar "chain." He also evolved the "Bedford attachment" for early gun-laying radar.

MEETINGS

Institution of Electrical Engineers

Radio Section.—"Radio Measurements in the Decimetre and Centimetre Wavebands" by R. J. Claydon, M.A.; J. E. Houldin, Ph.D., B.Eng.; H. R. L. Lamont, M.A., Ph.D.; and W. E. Willshaw, M.Sc.Tech., on November 7th.

"A Method of Increasing the Range of VHF Communication Systems by Multi-Carrier Amplitude Modulation," by J. R. Brinkley, on November 21st.

Both meetings will commence at 5.30 and will be held at the I.E.E., Savoy Place, London, W.C.2.

London Students' Section. — A "Brains Trust" Meeting will be held at 7.0 on November 6th at the I.E.E., London.

Cambridge Radio Group.—"Notes on the Stabilities of LC Oscillators" by N. Lea, B.Sc., on October 29th.

"Frequency Modulation," by K. R. Sturley, Ph.D., on November 20th.

Both meetings will be held at 6.0 in the Technical College, Collier Road, Cambridge.

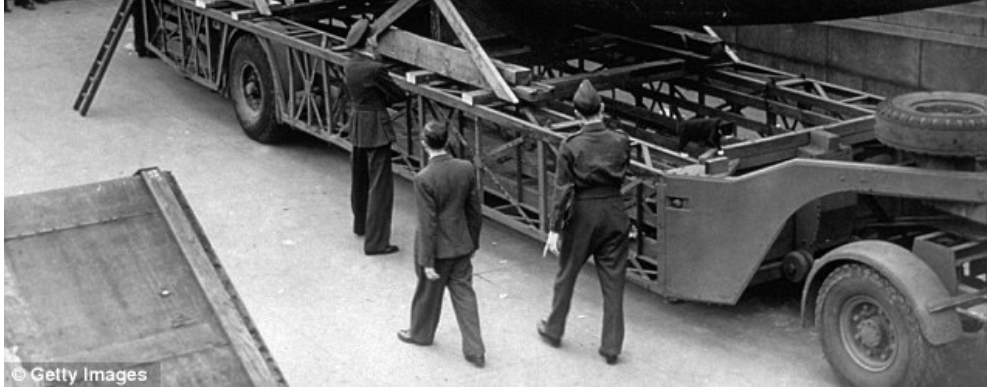
British Institution of Radio Engineers

"UHF Aerial Technique," by S. Button, on November 21st at 6.0 at the Institution of Structural Engineers, 11, Upper Belgrave Street, London, S.W.1.

Radio Society of Great Britain

"Aerial Systems for the Radio Amateur," by F. Charman (G6CJ), at 6.30 on November 16th at the I.E.E., Savoy Place, London, W.C.2.

World War Two era V2 Rocket below:



"In physics, escape velocity is the minimum speed needed for an object to "break free" from the gravitational attraction of a massive body. The escape velocity from Earth is about 40,270 km/h (25,020 mph)."

Escape velocity - Wikipedia, the free encyclopedia

Escape Velocity works out to 11,186.111 m/sec

EXTRA-TERRESTRIAL RELAYS

Can Rocket Stations Give World-wide Radio Coverage?

By ARTHUR C. CLARKE

ALTHOUGH it is possible, by a suitable choice of frequencies and routes, to provide telephony circuits between any two points or regions of the earth for a large part of the time, long-distance communication is greatly hampered by the peculiarities of the ionosphere, and there are even occasions when it may be impossible. A true broadcast service, giving constant field strength at all times over the whole globe would be invaluable, not to say indispensable, in a world society.

Unsatisfactory though the telephony and telegraph position is, that of television is far worse, since ionospheric transmission cannot be employed at all. The service area of a television station, even on a very good site, is only about a hundred miles across. To cover a small country such as Great Britain would require a network of transmitters, connected by coaxial lines, waveguides or VHF relay links. A recent theoretical study[1] has shown that such a system would require repeaters at intervals of fifty miles or less. A system of this kind could provide television coverage, at a very considerable cost, over the whole of a small country. It would be out of the question to provide a large continent with such a service, and only the main centres of population could be included in the network.

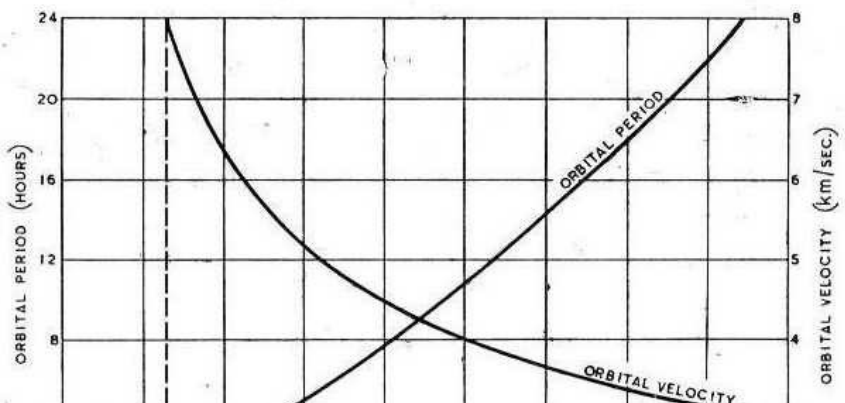
The problem is equally serious

logical extension of developments in the last ten years—in particular the perfection of the long-range rocket of which V2 was the prototype. While this article was being written, it was announced that the Germans were considering a similar project, which they believed possible within fifty to a hundred years.

Before proceeding further, it is necessary to discuss briefly certain fundamental laws of rocket propulsion and "astronautics." A rocket which achieved a sufficiently great speed in flight outside the earh's atmosphere would never return. This "orbital" velocity is 8 km per sec. (5 miles per sec), and a rocket which attained it would become an artificial satellite, circling the world for ever with no expenditure of power—a second moon, in fact.

the atmosphere and left to broadcast scientific information back to the earth. A little later, manned rockets will be able to make similar flights with sufficient excess power to break the orbit and return to earth.

There are an infinite number of possible stable orbits, circular and elliptical, in which a rocket would remain if the initial conditions were correct. The velocity of 8 km/sec. applies only to the closest possible orbit, one just outside the atmosphere, and the period of revolution would be about 90 minutes. As the radius of the orbit increases the velocity decreases, since gravity is diminishing and less centrifugal force is needed to balance it. Fig. 1 shows this graphically. The moon, of course, is a particular case and would lie on the curves of Fig. 1 if they were produced. The proposed German space-stations



television services in different parts of the globe. A relay chain several thousand miles long would cost millions, and transoceanic services would still be impossible. Similar considerations apply to the provision of wide-band frequency modulation and other services, such as high-speed facsimile which are by their nature restricted to the ultra-high-frequencies.

Many may consider the solution proposed in this discussion too far-fetched to be taken very seriously. Such an attitude is unreasonable, as everything envisaged here is a

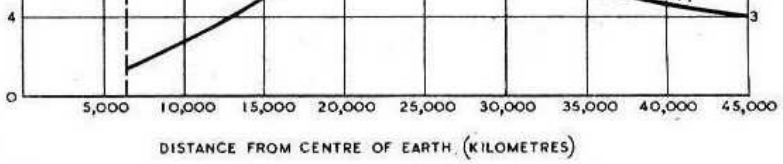


Fig. 1. Variation of orbital period and velocity with distance from the centre of the earth.

The German transatlantic rocket A10 would have reached more than half this velocity.

It will be possible in a few more years to build radio controlled rockets which can be steered into such orbits beyond the limits of

would have a period of about four and a half hours.

It will be observed that one orbit, with a radius of 42,000 km, has a period of exactly 24 hours. A body in such an orbit, if its plane coincided with that of the

8 Km/second = 8000 meters a second

Extra-terrestrial Relays—

earth's equator, would revolve with the earth and would thus be stationary above the same spot on the planet. It would remain fixed in the sky of a whole hemisphere and unlike all other heavenly bodies would neither rise nor set. A body in a smaller orbit would revolve more quickly than the earth and so would rise in the west, as indeed happens with the inner moon of Mars.

Using material ferried up by rockets, it would be possible to construct a "space-station" in such an orbit. The station could be provided with living quarters, laboratories and everything needed for the comfort of its crew, who would be relieved and provisioned by a regular rocket service. This project might be undertaken for purely scientific reasons as it would contribute enormously to our knowledge of astronomy, physics and meteorology. A good deal of literature has already been written on the subject.[2]

Although such an undertaking may seem fantastic, it requires

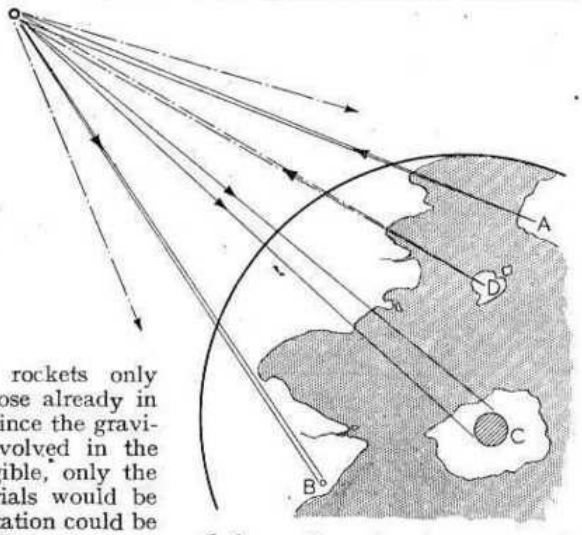


Fig. 2. Typical extra-terrestrial relay services. Transmission from A being relayed to point B and area C; transmission from D being relayed to whole hemisphere.

for its fulfilment rockets only twice as fast as those already in the design stage. Since the gravitational stresses involved in the structure are negligible, only the very lightest materials would be necessary and the station could be as large as required.

Let us now suppose that such a station were built in this orbit. It could be provided with receiving and transmitting equipment (the problem of power will be dis-

ments would be very small, as direct line of sight transmission would be used. There is the further important point that arrays on the earth, once set up, could remain fixed indefinitely.

Moreover, a transmission received from any point on the hemisphere could be broadcast to the whole of the visible face of

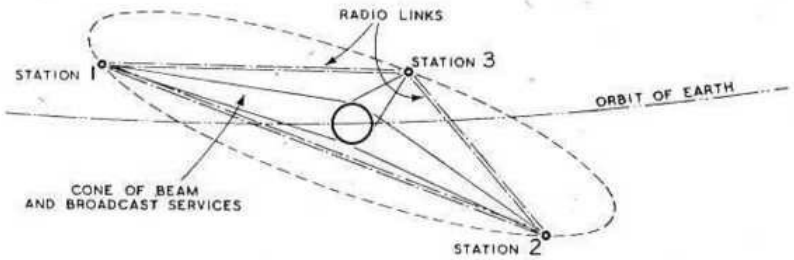


Fig. 3. Three satellite stations would ensure complete coverage of the globe.

the globe, and thus the requirements of all possible services would be met (Fig. 2).

It may be argued that we have as yet no direct evidence of radio waves passing between the surface

of the earth and outer space; all we can say with certainty is that the shorter wavelengths are not reflected back to the earth. Direct evidence of field strength above the earth's atmosphere could be

necessary evidence by exploring for echoes from the moon. In the meantime we have visual evidence that frequencies at the optical end of the spectrum pass through with little absorption except at certain frequencies at which resonance effects occur. Medium high frequencies go through the E layer twice to be reflected from the F layer and echoes have been received from meteors in or above the F layer. It seems fairly certain that frequencies from, say, 50 Mc/s to 100,000 Mc/s could be used without undue absorption in the atmosphere or the ionosphere.

A single station could only provide coverage to half the globe, and for a world service three would be required, though more could be readily utilised. Fig. 3 shows the simplest arrangement. The stations would be arranged approximately equidistantly around the earth, and the following longitudes appear to be suitable:—

30 E—Africa and Europe.
150 E—China and Oceana.
90 W—The Americas.

The stations in the chain would be linked by radio or optical beams, and thus any conceivable beam or broadcast service could be provided.

The technical problems involved in the design of such stations are extremely interesting,[3] but only a few can be gone into here. Batteries of parabolic reflectors would be provided, of apertures depending on the fre-

cussed later) and could act as a repeater to relay transmissions between any two points on the hemisphere beneath, using any frequency which will penetrate the ionosphere. If directive arrays were used, the power required obtained by V2 rocket technique, and it is to be hoped that someone will do something about this soon as there must be quite a surplus stock somewhere! Alternatively, given sufficient transmitting power, we might obtain the quencies employed. Assuming the use of 3,000 Mc/s waves, mirrors about a metre across would beam almost all the power on to the earth. Larger reflectors could be used to illuminate single countries or regions for the more restricted services, with con-

Isaac Newton

Physicist

Sir Isaac Newton Kt, PRS was an English physicist and mathematician who is widely recognised as one of the most influential scientists of all time and a key figure in the scientific revolution. Wikipedia

Born: January 4, 1643, Woolsthorpe-by-Colsterworth, United Kingdom

Died: March 31, 1727, Kensington, London, United Kingdom

Influenced: Albert Einstein, Edmond Halley, William Whiston, John Theophilus Desaguliers, Thomas Bayes

Influenced by: Johannes Kepler, Nicolaus Copernicus, More

Quotes

View 7+ more

Tact is the knack of making a point without making an enemy.

If I have seen further than others, it is by standing upon the shoulders of giants.

I can calculate the motion of heavenly bodies, but not the madness of people.

"His technique didn't always produce a result."

"While it covers a variety of topics, for our purposes the most relevant part of The Principia is the theory of gravity. Newton assumed there was a gravitational force between every pair of objects (an inverse square force as Hooke had suggested). This force caused the apple to fall and the planets to move around the Sun.

However knowing there is a force is not enough to make a prediction; Newton showed how to take the gravitational force, the equation F=ma and a newly invented mathematical technique called the Calculus to compute an orbit. **His technique didn't always produce a result.** *If you have a system of two objects (say a star with a single planet), it tells us the objects will orbit in an ellipse, a parabola or a hyperbola (depending on the exact conditions).*

It doesn't give us a result if there are three or more objects. In other words we can't use this approach to compute the orbits in our solar system since there is the Sun, six planets (Uranus, Neptune and Pluto hadn't been discovered yet), ten moons (four for Jupiter and six for Saturn) and an unknown number of comets. Something more is needed.

Producing an exact solution for Newton's equations with more than two objects became known as the three body problem. Newton didn't know how to solve the three body problem, he realized it was difficult (in fact he claimed it was too difficult for humans to solve). From the time of Newton up to the present, many people have studied it; some progress was made and a few specialized solutions were discovered."

http://umich.edu/~lowbrows/reflections/2006/dsnyder.17.html

Newton formulated his famous inverse-square law to describe the behavior of celestial bodies. Furthermore, he intuitively theorized that the full force of the Earth's gravity could be considered as emanating from a point source at its center. But when he checked his theory with calculations using an imprecise figure for the Earth's radius, he found he was off by enough to make him doubt his point-source assumption, and he set aside the problem indefinitely.

Orbital Mechanics By Vladimir A. Chobotov

Afterward, honors came to Newton: elected to Parliament in 1689; appointed to the prestigious position of Warden of the Mint in 1696; elected president of the Royal Society in 1703; knighted in 1705.

But decades of bitter controversy and his own neurotic temperament took their toll in his later life. At one point he collapsed from a nervous breakdown and was forced to retire for two years. He had always been an ardent believer in alchemy and, in his later years, he wasted much of his time chasing recipes for gold. He

became a mystic, too, producing a vast amount of writing on the more abstruse passages of the Bible.

Yet, in the end, he was a modest man, who said of his profound contributions, "I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell, while the great ocean of truth lay all undiscovered before me."

Sir Isaac Newton died in 1727 and was buried in Westminster Abbey along with the greatest of England's heroes.

Newton's Laws

The following three laws of motion given by Newton are considered the axioms of mechanics:

1) Every particle persists in a state of rest or of uniform motion in a straight line (i.e., with constant velocity) unless acted on by a force.

2) If $\boldsymbol{F}$ is the (external) force acting on a particle of mass m which, as a consequence, is moving with velocity $\boldsymbol{v}$, then

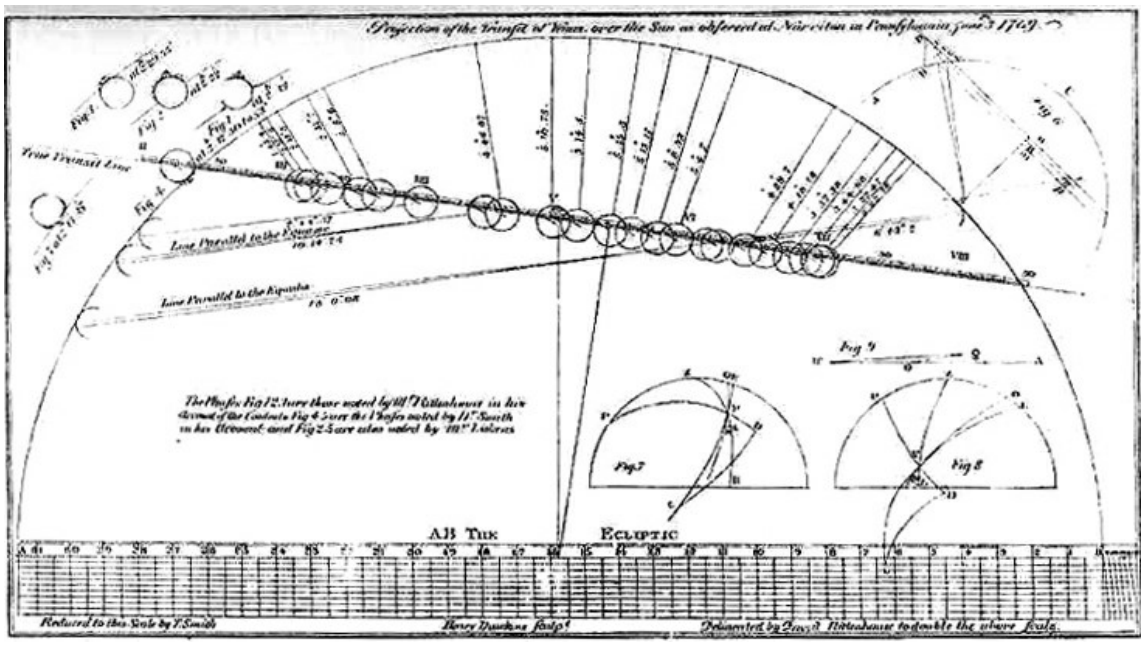
$$\boldsymbol{F} = \frac{\mathrm{d}}{\mathrm{d}t}(m\boldsymbol{v}) = \frac{\mathrm{d}\boldsymbol{p}}{\mathrm{d}t} \tag{1.1}$$

where $\boldsymbol{p} = m\boldsymbol{v}$ is called the momentum. If m is independent of time t, this becomes

$$\boldsymbol{F} = m\frac{\mathrm{d}\boldsymbol{v}}{\mathrm{d}t} = m\boldsymbol{a}$$

The solution of one problem led to another. The problems of celestial mechanics led Newton to perfect the modern science of moving bodies that had originated in Galileo's experiments with falling bodies. Because Newton and others believed in the existence of an all-pervasive universal ether, he had to consider how frictional resistance would affect the motion of planets moving around the Sun. To show that universal gravitation was responsible for the motions of the solar system, Newton had to mathematically prove that a sphere acted like a point-mass concentrated at its center. The work was difficult, even for Newton. On July 14, 1686, he confessed to Halley, "but yet to do this business right is a thing of far greater difficulty than I was aware of."[733]

Science and Technology in World History, Volume 3: The Black Death, the ...By David Deming



Who Can Explain The Earth Moving Around THE MOTIONLESS SUN For a Sum?

"One of the most famous and consequential meetings in the history of science took place in the summer of 1684 when the young astronomer Edmund Halley paid a visit to Isaac Newton, during which Halley asked Newton what path a planet would follow if it were attracted toward the sun by a force proportional to the reciprocal of the squared distance. The idea that the planets were attracted to the sun by such an "inverse-square" force law had by then occurred to several people, including the architect Christopher Wren, the scientist Robert Hooke, and to Newton himself, following the publication by Huygens of the expression F = mw2r for the "centrifugal (outward) force" of a particle of mass m moving in a circular path of radius r with angular speed w. This is equivalent to Kepler's third law, which may be expressed as M = w2r3, if we equate the outward "force" on a planet of mass m with the inward force of attraction toward the sun of magnitude F = Mm/r2, where M is the mass of the sun (in suitable units so that G = 1). Of course, at the time, the constant M in Kepler's third law was not known to be the mass of the sun, but it was clear that if both Huygens's law of centrifugal force and Kepler's third law were to be satisfied for circular orbits, the force of attraction must be proportional to the reciprocal of the square of the distance. Furthermore, it isn't hard to see (from the modern Newtonian perspective) that Kepler's second law, stating that a planet sweeps out equal areas in equal times, will automatically be satisfied given only that the force of attraction is always directly towards the sun, i.e., given a "central force". This leaves unconfirmed only Kepler's first law, which states that the planets move in elliptical paths with the sun at one of the focal points. Wren, Hooke, and Halley had discussed the problem at a coffee house following a meeting of the **Royal Society in January of 1684, and Wren had offered a cash prize to whoever could provide a derivation of the shape of planetary orbits under the assumption of an inverse-square central force of attraction toward the (presumed stationary) sun**. Hooke had claimed to have a proof that the paths were ellipses, but never provided it. Against this background, Halley paid a visit to Newton, who later told Abraham De Moivre about the fateful meeting. According to De Moivre

"In 1684 Dr Halley came to visit him at Cambridge. After they had been some time together, the Dr asked him what he thought the curve would be that would be described by the planets supposing the force of attraction towards the sun to be reciprocal to the square of their distance from it. Sir Isaac replied immediately that it would be an ellipse. The Doctor, struck with joy and amazement, asked him how he knew it. Why, saith he, I have calculated it. ***Whereupon Dr Halley asked him for his calculation without any farther delay. Sir Isaac looked among his papers but could not find it, but he promised him to renew it and then to send it him****..."*

As is well known, Halley's question prompted Newton to formulate his ideas about mechanics and universal gravitation. ***The answer to Halley grew and became progressively more comprehensive until, in a remarkably short time (about 18 months), Newton had composed the three-volume work entitled The Mathematical Principles of Natural Philosophy, usually called by the Latin title "Philosophiae Naturalis Principia Mathematica", or simply "Principia", comprising the foundation of modern physics.*** It represents arguably the greatest single advance in human understanding ever

achieved in the history of science. Just two months after its publication, the mathematician David Gregory wrote a letter to Newton, saying

"Having seen and read your book I think my self obliged to give you my most hearty thanks for having been at the pains to teach the world that which I never expected any man should have known. For such is the mighty improvement made by you in the geometry, and so unexpectedly successful the application thereof to the physics, that you justly deserve the admiration of the best Geometers and Naturalists, in this and all succeeding ages."

And yet, it's a curious fact that when the Principia was published (at Halley's expense) in 1687, it did not actually contain the demonstration that Halley had requested. In a careful series of propositions (11 to 13 of Book 1), the Principia shows that a planet moving in a conical orbit under the influence of a central force toward one of the foci is undergoing acceleration toward that foci with a magnitude proportional to the reciprocal of the squared distance, and hence is subject to an inverse-square force. This is the converse of Halley's question, which asked for a demonstration of the shape of an orbit given that the planet was subjected to an inverse-square force. The first edition of Principia simply stated that the answer to Halley's question "followed from" the converse proposition, which of course is not a generally valid argument. **Newton later claimed that he hadn't included the proof for the original question – the one that prompted the entire work – because he regarded it as "very obvious". Whether this is a plausible reason for omitting it is debatable**."

http://www.mathpages.com/home/kmath658/kmath658.htm

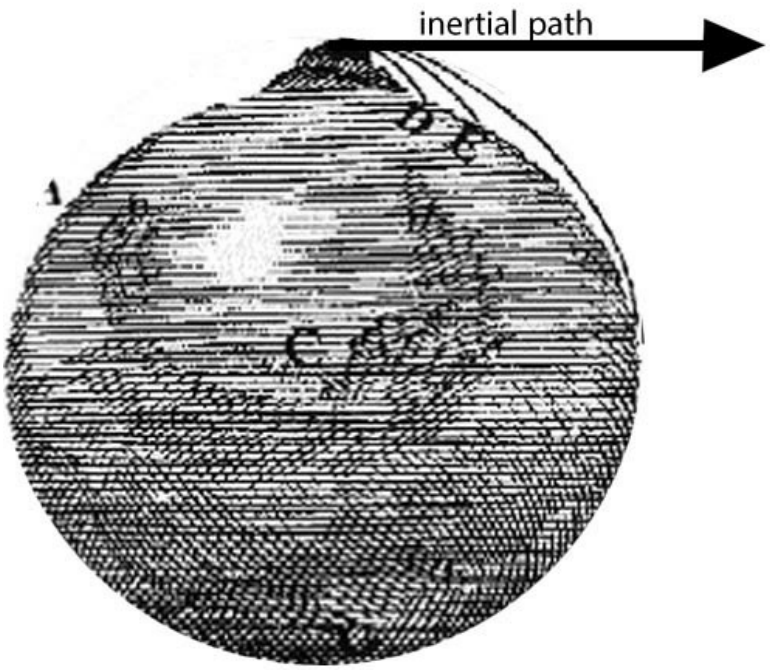
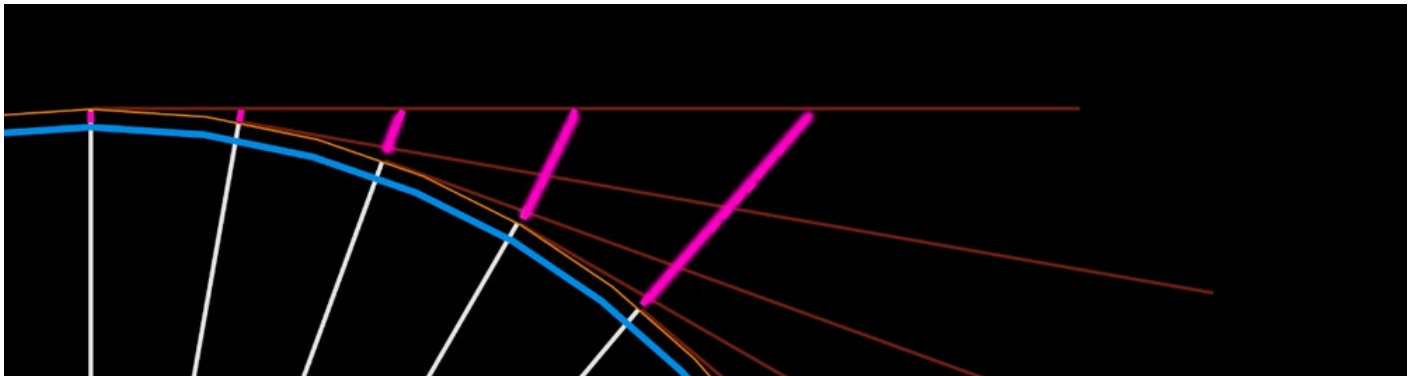


Illustration Below: Compare the Dark Red imagined Straight Line Path to the Orange imagined Orbit.

Please Note: The imagined projectile NEVER takes this dark red (linear) path.

It is supposed to be in orbit following the orange (circular) path.

By imagining this relationship in geometric terms, perhaps we can see what Newton's reasoning was. The small magenta lines represent the accelerated (ever increasing) gravitational pull. The dark red line represents the linear path due to inertial motion, that the projectile 'seeks' to follow. Here we can visually see how this linear and constant path can relate to the accelerated motion we term 'gravity' represented by the magenta lines. Each magenta line represents the ever increasing speed a projectile experiences as it is drawn towards Earth's center, by the force we term 'gravity' in one second of time.



GRAVITY : AN ACCELERATED PROCESS

Time= 1 second Distance Fallen = 4.9 meters @ Velocity = 9.8 meters/second

Time= 2 seconds Distance Fallen = 19.6 meters @ Velocity = 19.6 meters/second

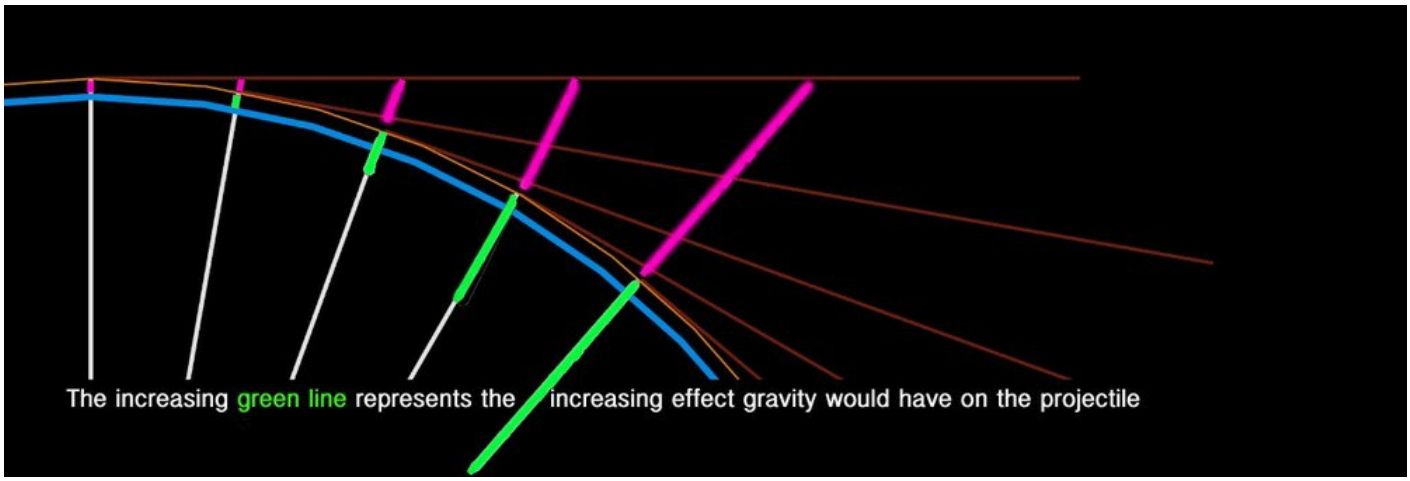
Time= 3 seconds Distance Fallen = 44.1 meters @ Velocity = 29.4 meters/second

Time= 4 seconds Distance Fallen = 78.4 meters @ Velocity = 39.2 meters/second

Time= 5 seconds Distance Fallen = 123 meters @ Velocity = 49.0 meters/second

http://www.physicsclassroom.com/class/1DKin/Lesson-5/How-Fast-and-How-Far

It would seem that Newton forgets that the projectile never follows the linear *(the dark red path*). We can see how he relates a linear velocity to an accelerated one, geometrically.

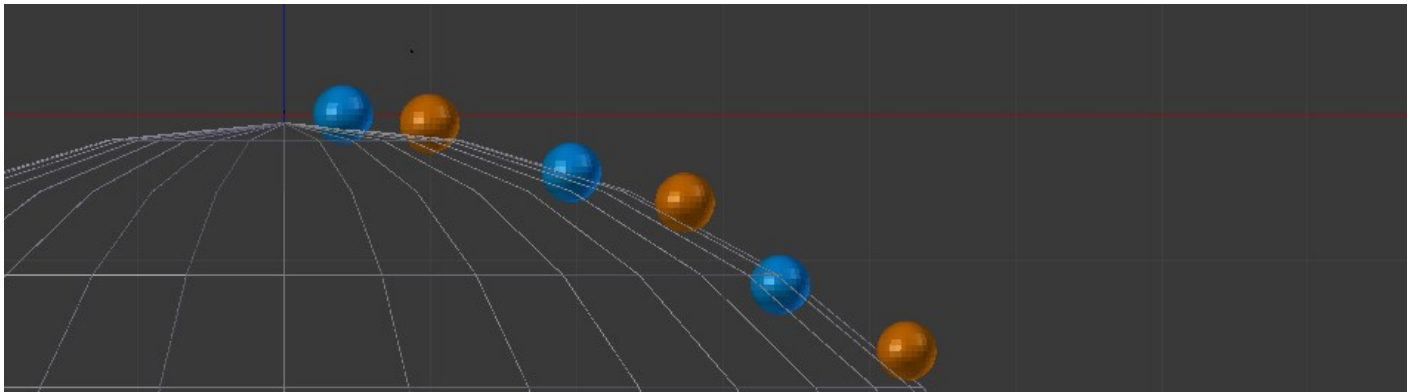


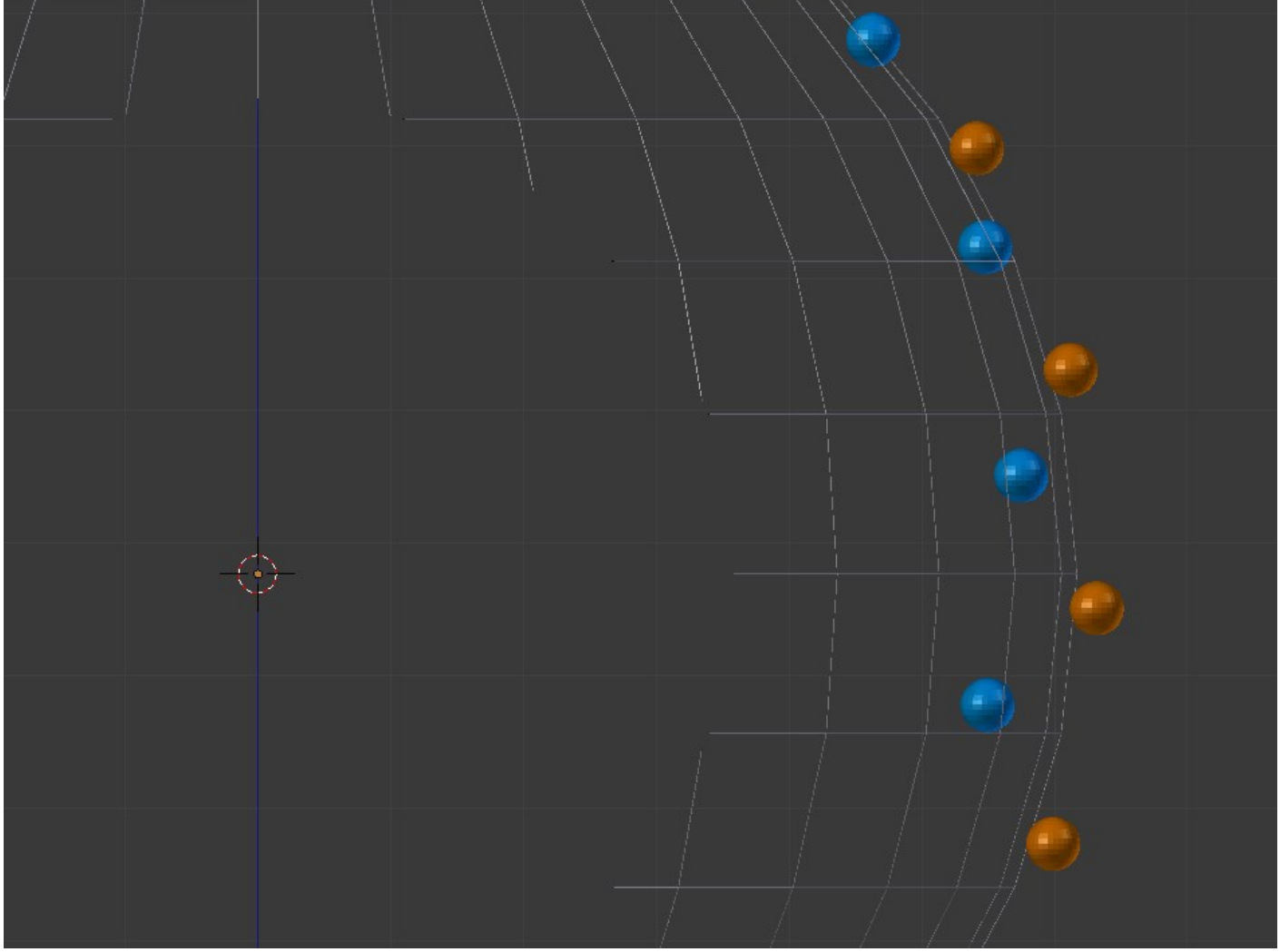
Newton's concept would seem to rely on comparing a linear and fixed velocity to an accelerated one. This imagined linear motion is represented by the dark red lines in the illustration above. The magenta lines represent the increasing 'pull' of gravity compared to the imagined inertial path. The green lines represent the actual 'pull' of gravity a projectile would experience since it never actually follows the dark red path. ***It is supposed to be in orbit following the orange (circular) path.***

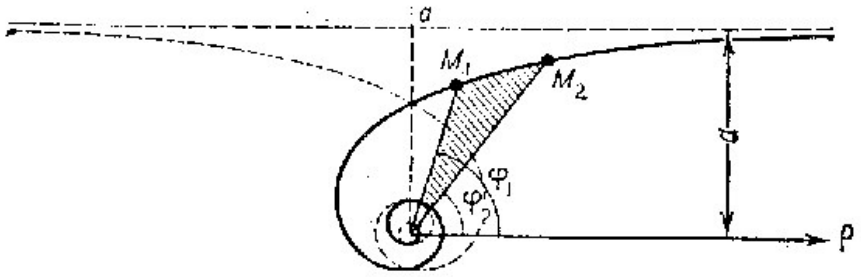
The gravitational pull that prevents the imagined cannonball from flying off in a straight line would continue to increase and would 'pull' the projectile down from the orange circular orbital path along the green path, causing the projectile to move closer and close to the Earth. The way Newton imagines his thought experiment, the accelerated (IE increasing) force of gravity is always somehow balanced out by the constant velocity of the projectile as if the projectile had followed the linear path and had been allowed to ascend to that relative altitude away from the Earth, where it would presumably experience that much less gravitational pull, allowing it to move that much further away.

He makes use of the initial gravitational velocity and then ignores that fact that this velocity would keep increasing. It is as if he imagines the cannonball in two places or rather existences, at once, in one 'frame of reference' or 'universe' the cannon ball followed the dark red straight line path and Newton then can use this parameter in his equations when he calculates what would happen to the cannonball in his other 'frame of reference' (or universe) where the cannonball followed the orange circular orbital path. In other words, mathematically Sir Isaac can have his cake and eat it too.

Below, Newton's imagined orbit represented by the orange cannon balls which ignores gravity's accelerated pull. The blue cannonball represents what the accelerated force would do to the imagined cannonball.







"In 1710, prior to the appearance of the second edition of Principia, Johann Bernoulli published a critique of the first edition, pointing out that the first corollary to Proposition 13 had not been demonstrated, and that it certainly didn't follow immediately from the converse proposition, as the first edition seemed to claim. Even after learning of the added words in the second edition, Bernoulli was unconvinced. To support his objection, ***Bernoulli noted that a similar sounding argument, when applied to inverse cube forces, would lead to a wrong conclusion. If a particle moves along any logarithmic spiral subject to a central force, it can be shown that the force varies as the reciprocal of the cube of the distance to the center, but the converse does not follow, because particles subject to an inverse cube force can follow other paths, such as hyperbolic spirals.***

However, after the issue had been in dispute for nearly 10 years, Bernoulli ultimately (in 1720) acknowledged the legitimacy of Newton's proof, and agreed that the inverse cube case was not a valid counter-example. **Newton's proof relies on the fact that the equations of motion involve only the second derivative of the particle's position, so, given the initial position, direction, and speed of the particle (i.e., the zeroth and first derivatives), these equations can be uniquely integrated to give the path of a particle – a fact which is fairly intuitive because the equations explicitly give the second derivative of the particle's position as a function of its position. (In later centuries, with increasing mathematical rigor, even this assertion would be considered to need a proof, but it was accepted as sufficiently obvious by all the participants in the controversy during Newton's lifetime.)** *Furthermore, Newton had shown that all possible initial conditions can be achieved by a conic through a given point with a given focus – assuming an inverse square force. It follows (just as Newton said) that all possible solution paths for an inverse square force are conics. In contrast, a similar argument cannot be made for an inverse cube force and logarithmic spirals, because such spirals cannot produce all possible initial conditions. The other possible initial conditions correspond to the other species of paths that satisfy an inverse cube force.*

Once this was explained, Bernoulli agreed that Newton's proof was valid, although he continued to claim that the analytic approach using the Leibnizian notation was the surer way of achieving general and comprehensive results. Even though almost all modern scholars agree that Newton's "sketch of a proof" was valid (at least in the third edition, and augmented with some fairly obvious supplemental statements),.modern science has followed Bernoulli's advice, and no one today would dream of trying to approach such problems using the synthetic geometrical methods of Newton. **In fact, Newton's neo-classical methods were never used successfully by anyone other than himself. As the historian of science William Whewell wrote in 1847**

The ponderous instrument of synthesis, so effective in his hands, has never since been grasped by one who could use it for such purposes; and we gaze at it with an admiring curiosity, as on some gigantic implement of war, which stands idle among the memorials of ancient days, and makes us wonder what manner of man he was who could wield as a weapon what we can hardly lift as a burden.

Surprisingly, though, the controversy over the validity of Newton's key demonstrations has not entirely ended. To this day, there occasionally appear papers in scholarly journals complaining that Newton never actually gave a valid answer to Halley's question, and specifically that the reasoning presented in support of Corollary 1 of Proposition 13, even in the third edition, is inadequate if not outright specious. Such charges are invariably met with a flurry of responses, carefully explaining the subtle force of Newton's reasoning, and disposing of purported counter-examples."

http://www.mathpages.com/home/kmath658/kmath658.htm

https://en.wikipedia.org/wiki/Hyperbolic_spiral

" To put it in simple terms, since Newton's second law relates functions which are two orders of derivative apart, you only need the 0th and 1st derivatives, position and velocity, to "bootstrap" the process, after which you can compute any higher derivative you want, and from that any physical quantity. This is analogous to (and in fact closely related to) the fact that to solve a second-order differential equation, you only need two initial conditions, one for the value of the function and one for its derivative."

http://physics.stackexchange.com/questions/4102/why-are-there-only-derivatives-to-the-first-order-in-the-lagrangian

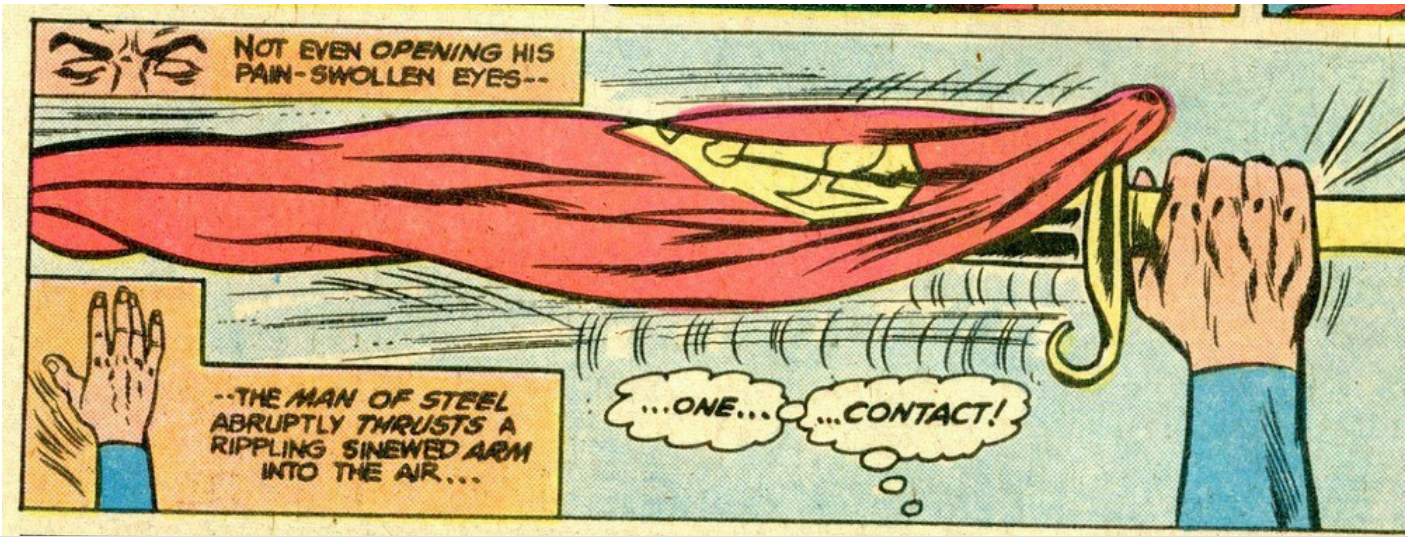
A Flawed Thought?

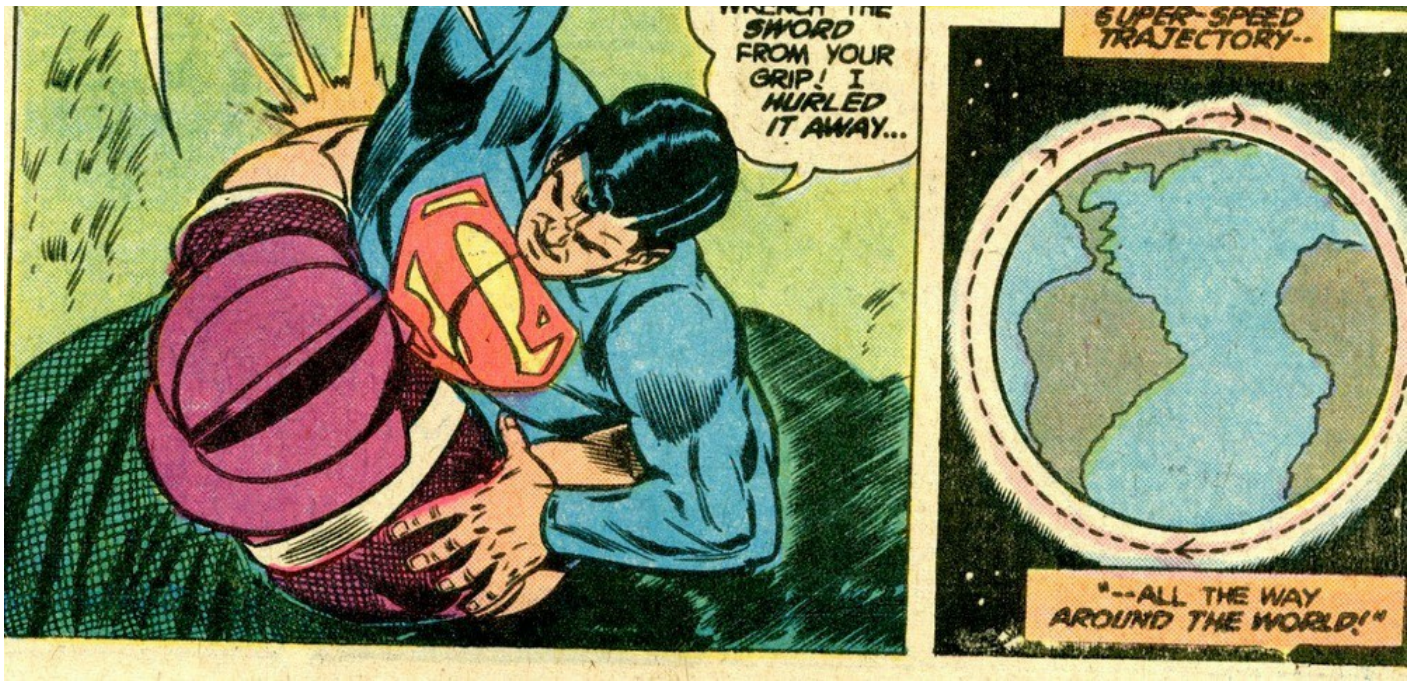
Sir Isaac Newton's famed cannon ball thought experiment is problematic despite having what would seem to be a very solid mathematical foundation. But even if the math works like clockwork, (as if a divine mind and hand had come up with it), there is still the logical inconsistency between the two motions which are considered separately. The 'linear' motion is an inertial one, (*one that has a fixed velocity*). Gravity is an accelerated motion, the velocity is always changing and increasing in direction of the Earth's center.

The problem is that the imagined projectile never follows the straight line path its inertia 'desires' to. Conceptually the projectile retains a constant velocity in the gravitational field of Earth. Yet the object is being pulled by gravity which is an accelerated process. Gravity would eventually overcome the fixed velocity of the imagined cannon ball and we'd expect to watch the projectile take on a spiraling orbit that would cause it to *eventually crash into the surface of the Earth.*

Thought Bubbles & Thought Experiments

A thought experiment is the beginning of an investigation, not the end. It is just an idea. A thought experiment is not empirical evidence. The thinker controls all the parameters and can and will easily contrive the narrative of the thought experiment to conform with whatever end they desire. Sir Isaac creates a mathematica model to prove his ideas, his genius is in how he uses math as a tool to model his concept of gravitation.





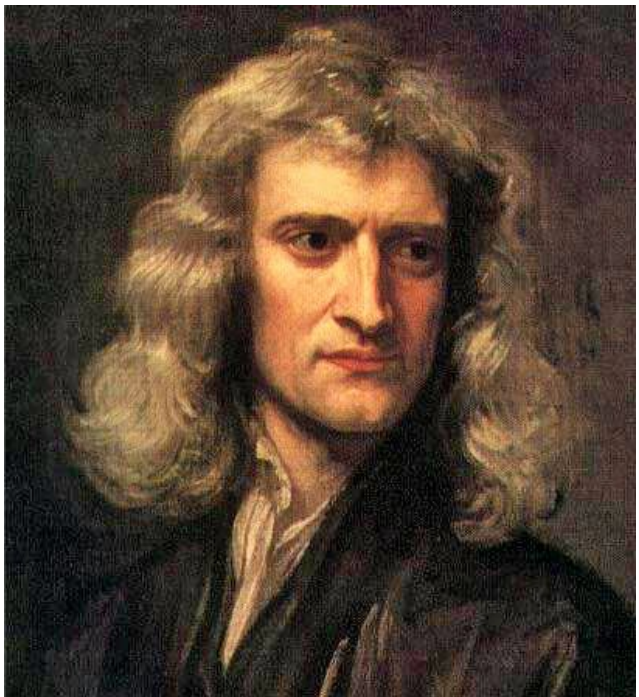
Sir Isaac Newton: A True Genius?

Sir Isaac Newton uses an impressive mathematical model to prove his metaphysical theory. He cannot do an actual expeiment, as such an experiment, like a centrifugal one, shows there are problems with his reasoning.

Newton relates the motion of the Moon to the falling apple and mathematically shows how gravity effects both bodies in universal fashion. The Moon is considered to possess inertia which means it 'wants' to travel in a straight line at around 1000 meters a second or so. Gravity is supposed to be the force that acts to prevent this linear motion. That linear motion would work out to 0.00136 meters a second relative motion between the Moon and the Earth causing the Moon to move away from the center of the Earth that distance (some 1.4mm) in one second. Gravity is supposed to pull the Moon towards the Earth by that very amount, balancing everything out and creating a seeming eternal orbit of the Moon around the Earth. *See Apples & Oranges, below, for more.*

Newton shows how a *(logically or conceptually flawed)* mathematical model can be constructed that can show how a body can fall around another despite being unable to physically demonstrate such a concept in experiment here on Earth. Newton's 'genius' would seem to be in the field of mathematics, a little more so than physics. Prior to the advent of projects like NASA, nobody could claim any experimental proof beyond a flawed mathematical model.

'Brilliant' Mathematics Used to Prove a Model



The Parabola

"In nature, approximations of parabolas and paraboloids are found in many diverse situations. The best-known instance of the parabola in the history of physics is the trajectory of a particle or body in motion under the influence of a uniform gravitational field without air resistance (for instance, a ball flying through the air, neglecting air friction).

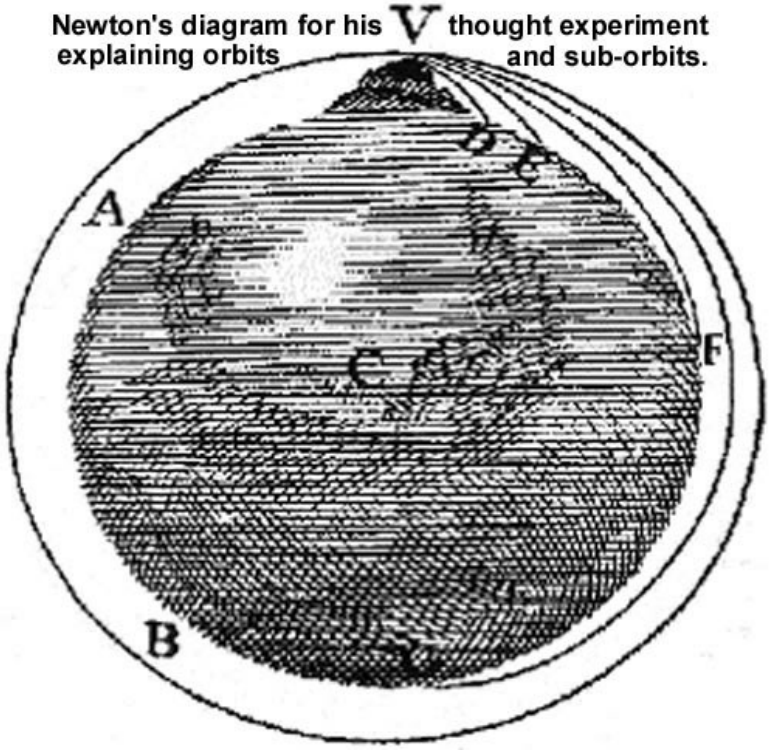
The parabolic trajectory of projectiles was discovered experimentally by Galileo in the early 17th century, who performed experiments with balls rolling on inclined planes. He also later proved this mathematically in his book Dialogue Concerning Two New Sciences.[14][k]For objects extended in space, such as a diver jumping from a diving board, the object itself follows a complex motion as it rotates, but the center of mass of the object nevertheless forms a parabola. As in all cases in the physical world, the trajectory is always an approximation of a parabola. The presence of air resistance, for example, always distorts the shape, although at low speeds, the shape is a good approximation of a parabola. At higher speeds, such as in ballistics, the shape is highly distorted and does not resemble a parabola.

Another hypothetical situation in which parabolas might arise, according to the theories of physics described in the 17th and 18th centuries by Sir Isaac Newton, is in two-body orbits; for example the path of a small planetoid or other object under the influence of the gravitation of the Sun. Parabolic orbits do not occur in nature; simple orbits most commonly resemble hyperbolas or ellipses. The parabolic orbit is the degenerate intermediate case between those two types of ideal orbit. An object following a parabolic orbit would travel at the exact escape velocity of the object it orbits; objects in elliptical or hyperbolic orbits travel at less or greater than escape velocity, respectively. Long-period comets travel close to the Sun's escape velocity while they are moving through the inner solar system, so their paths are close to being parabolic."

ASK NASA: There is no True Vacuum!

"There is matter spread all through the Universe, it is just spread very, very, very, very thin. The average density of gas in our Milky Way galaxy is about one atom per cubic centimeter. This is a much better vacuum than is obtained in a laboratory, but when integrated over the Galaxy, comes out to quite a lot of mass. This gas is mostly hydrogen (~90%), and helium (~9%), and less than one percent everything else. The gas between galaxies is even thinner, but there is probably something there (it hasn't been measured, though). These elements are in the Earth because they were present when the gas cloud that formed our solar system collapsed to form the Sun and the planets."

http://helios.gsfc.nasa.gov/qa_sp_ms.html



Newtonian Orbital Mechanics

The idea is that an object can somehow fall around the Earth by moving at a specific and high velocity, causing it to achieve an orbit. Yet any experiment we do on Earth, clearly shows that there is no such sweet spot. All we can demonstrate (outside of NASA) is that an object would always fall towards the center of the Earth. If a projectile achieved a velocity high enough to cause it to cancel the pull of gravity, in the manner Newton theorizes, centrifugal force would become more prominent and the projectile would begin to be free of Earth's gravity more and more, eventually becoming like the stone freed

from the sling, or what happens to the ball in the video below when the boundary is taken away. The ball flies off in a straight line. Centrifugal force would seem to want to move the projectile away from the Earth.

Newton seems to ignore centrifugal force and the effect it would have on his imagined orbit. Would this very real inertial effect not cause the imagined cannonball to move further away from the Earth as the centrifugal force would cancel some of the gravitational pull?

Don't Tell Newton: The International Space Station Needs Flight Control To Maintain Its Orbit

"The ISS employs a total of four CMGs as primary actuating devices during normal flight mode operation. The objective of the CMG flight control system is to hold the space station at a fixed attitude relative to the surface of the Earth. In addition, it seeks a Torque Equilibrium Attitude (TEA), in which the combined torque contribution of gravity gradient, atmospheric drag, solar pressure, and geomagnetic interactions are minimized. In the presence of these continual environmental disturbances CMGs absorb momentum in an attempt to maintain the space station at a desired attitude. The CMGs will eventually saturate (absorbing momentum to the point where they can absorb no more), resulting in loss of effectiveness of the CMG array for control. Some kind of momentum management scheme (MMS) is necessary to allow the CMGs to hold a desired attitude and at the same time prevent CMG saturation. Since the CMGs are momentum-exchange devices, external control torques must be used to desaturate the CMGs, that is, bring the momentum back to nominal value. Some methods for unloading CMG momentum include the use of magnetic torques, reaction thrusters, and gravity gradient torque. For the space station, the gravity gradient torque approach is preferred because it requires no consumables or external hardware and because the gravity-gradient torque on the ISS can be very high.[6]"

https://en.wikipedia.org/wiki/Control_moment_gyroscope#International_Space_Station

1955 Television: Disney produced Educational Programming Video, below:

Centrifugal force explained below. This video shows why the Newtonian concept of orbital mechanics is flawed.

Proof That Centrifugal Force Is Not Real

Like a stone from the Biblical sling of David. There is no magic Newtonian sweet spot. At least not that we can demonstrate with empirical experiment or observation here on Earth. If the Moon is a physical object in orbit about the Earth, the reason it maintains that position is due to something other than what we are told. It would seem to be more complicated than we understand.

If what we are told is true than some other force of nature would seem to be at work. I tend to think the simpler explanation is that nobody can prove any of this. Man cannot achieve the engineering feats that we have been told "he" has.

Slinging 30 Meter Distance

If an object were to become free of gravity's influence altogether, it would then no longer be tethered to the Earth and the following effect, the Coriolis effect (another fictitious force which is also inertial based), would be exhibited by the object.

The Earth would move away from the object while the object flew off like the stone from the sling. Such an object would still be in orbit around the Sun, just no longer orbiting the Earth and that would seem to be something that would effect its (solar) orbit in some manner. This body would have an additional velocity in a specific direction it did not possess prior to becoming free from Earth's gravitational influence. Would tho not also effect its orbital position around the Sun and cause it to begin to move away at an ever increasing velocity. eventually leaving its former orbital position for parts unknown?

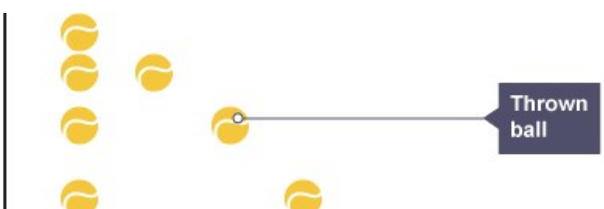
Please see this MIT video below.

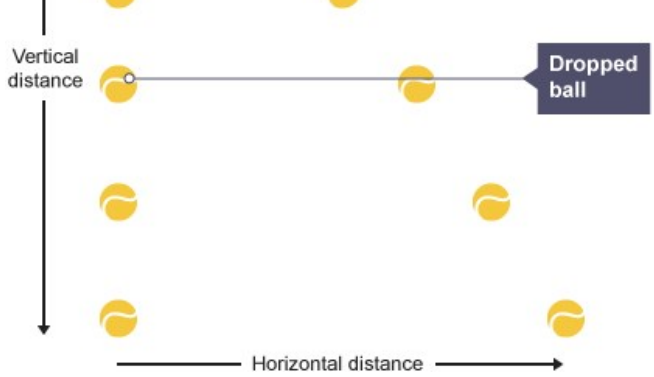
MIT Coriolis Effect Demo

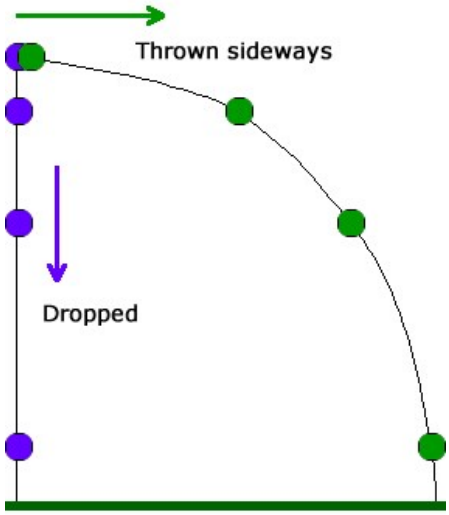
Ballistic physics is pretty clear and also easily demonstrated.

The basic idea is that an object fired from say a cannon, falls as it normally would if simply dropped from a height, since it was fired from a cannon, it also has a forward or horizontal motion. The time it takes to hit the ground is the same whether it has this forward motion or not.

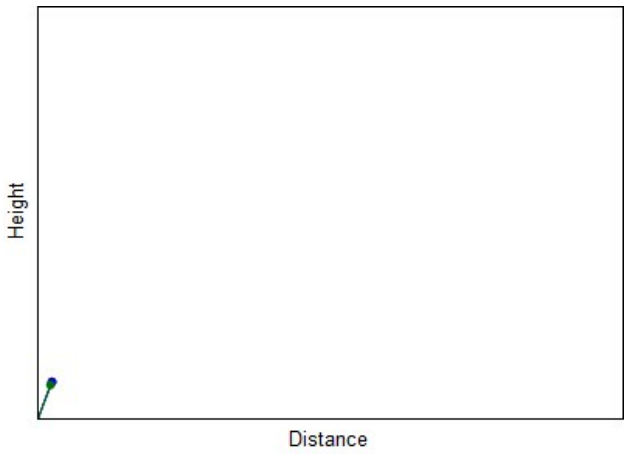
https://en.wikipedia.org/wiki/Ballistics







Horizontal Projectile Motion



If a centrifugal type effect is used to free an object from gravity's power, then the object either flies off like a stone from the sling, or falls back to Earth.

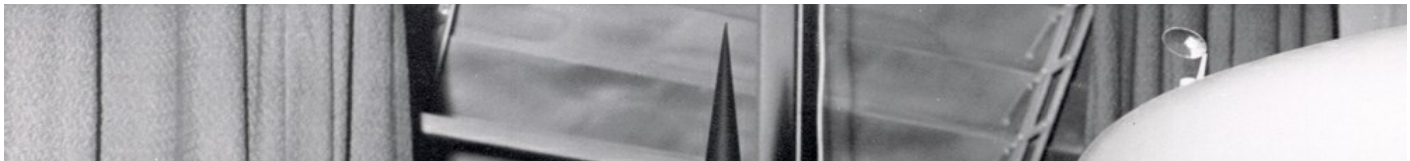
If "Escape Velocity" is not reached, the object would simply have its falling time extended, as its rate of fall would be some value less than that the normal 32 feet per second or so. *The object takes longer to fall back to the ground. But it still falls back.*

There is no oscillating, in between "sweet spot". Gravity is only an attractive (and accelerated, *i.e. not constant*) force as far as we can demonstrate on Earth. There would seem to be a need for some other explanation which would be more complex in nature.

An experiment here on Earth, with a dropped apple, clearly shows that what we term "gravity' is an attractive property. We cannot simply explain orbits with this concept, as we'd expect the planetary bodies to crash into each other.

We also cannot duplicate with magnets or static electrical attraction, the orbits of planets in an actual, physical experiment.

It would seem much of what we think of as real is little more than Hollywood magic.

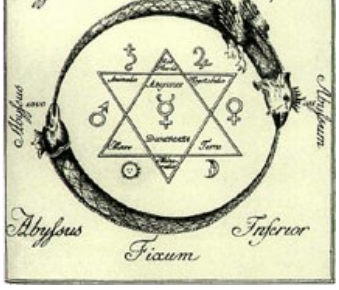


Dr. von Braun WRONG???

http://math.ucr.edu/home/baez/physics/General/Centrifugal/centri.html

"Next, von Braun draws a picture of a satellite in Earth orbit. Acting on the satellite are two forces: gravity, pulling the satellite toward Earth, and this centrifugal force, pushing the satellite away. He writes "A circular orbit occurs whenever a small mass, travelling through the gravitational field of a big one, happens to have a speed at which the centrifugal force is precisely strong enough to balance the large body's gravitational pull." And later, "If the balance between gravitational and centrifugal force is not perfect, [...] the small body will describe an elliptical path around the large one.""

"In an inertial frame, if there really were two equal-but-opposite forces on the satellite as von Braun drew them, then the total force on it would be zero. So it wouldn't accelerate; it would move in a straight line with constant speed. Since the orbiting satellite doesn't move in a straight line, neither von Braun's picture nor his explanation can be right." Don Koks 2003

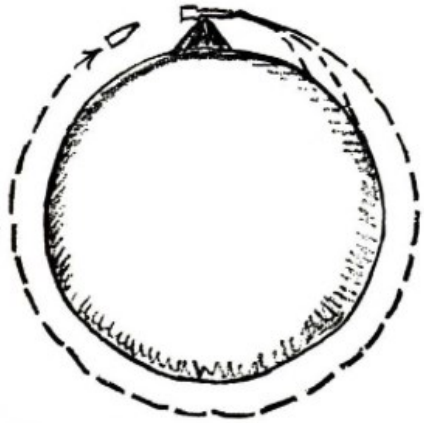


Ouroboros Illustration, above, compare to the famed cannon ball experiment illustration, below...

Dr. von Braun, right, and Robert C. Seamans Jr., Associate Administrator, NASA, discuss task of a spaceman. Ears of the one in background don't burn—he's just a dummy in a space-capsule exhibit.

Dr. Wernher von Braun Explains:

Why a Satellite Stays Up



Q ***What makes a satellite go into an orbit?***

A Imagine yourself standing on a high mountain peak, well above the atmosphere, firing a gun in a horizontal direction. (See my sketch above.) The shell, after leaving the gun barrel, will first fly horizontally. But soon the earth's gravitational pull bends the trajectory downward, as in the shortest of the paths in the sketch.

Reload the gun with a more powerful charge and the shell will fly farther, as shown by the next-longer path in the sketch. Its trajectory will be less deflected because the centrifugal force (as it follows the earth's curvature) is increased by its higher speed, and more effectively counteracts the earth's gravitational pull.

If you could use a charge powerful enough to give your shell a velocity of about 4.9 miles a second (17,600 m.p.h.), *the curvature of the downward-bent trajectory would become equal to the curvature of the earth*. The shell would keep flying and flying, and about 85 minutes later you'd better take cover—because the projectile, having gone all the way around the earth, would approach you from behind and hit the breech of the gun in the rear. The shell would have traveled in a circular orbit, the longest and globe-circling path in my sketch. If you don't believe it, ask John Glenn, Scott Carpenter, Wally Schirra, or Gordon Cooper.

In more general terms, this is what makes an orbit tick, and decides what kind of an orbit it will be:

A circular orbit occurs whenever a small

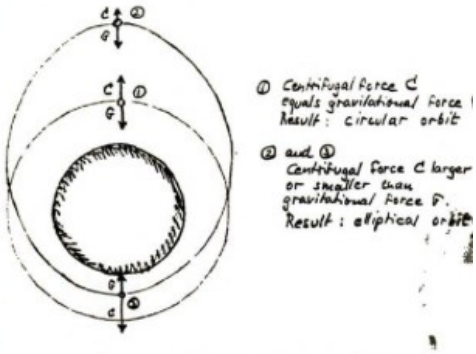
CONTINUED

Dr. Wernher von Braun continued

mass, traveling through the gravitational field of a big one, happens to have a speed at which the centrifugal force is precisely strong enough to balance the large body's gravitational pull. This precision exists, to a high degree, in the orbiting of the moon around the earth, and of the earth and

Venus around the sun.

If the balance between gravitational and centrifugal force is not perfect, but the centrifugal force is strong enough to prevent a direct collision, the small body will describe an elliptical path around the large one. Comets follow elliptical orbits around the sun.



The second of my sketches sums up the conditions that will give rise to a circular or ellipitical orbit, respectively.

Q ***What is a synchronous satellite?***

A A synchronous satellite (such as our recently launched Syncom No. 2) is a spacecraft coasting from west to east in a very high circular orbit, with a period of revolution of exactly 24 hours. An additional requirement is that the plane of the orbit must coincide, at least fairly nearly, with the plane of the equator.

Since the earth likewise revolves about its axis from west to east once every 24 hours, and since the earth's axis is at right angles to the plane of the equator, a synchronous satellite will appear to stand still, forever—directly above one particular spot on the equator. (Or if it has been launched on a path somewhat inclined to the equator, as in the case of Syncom No. 2, it will appear to move back and forth

CONTINUED

Dr. Wernher von Braun continued

with a figure-8 motion above such a spot. As is required for a 24-hour period of revolution, its height is always 22,300 miles above the earth's surface.

Synchronous satellites are of great interest for global communications. Because of its great distance from earth (about six earth radii), a 24-hour satellite is simultaneously visible from a vast portion of the globe. For example, such a satellite "hovering" above the Amazon delta in Brazil would be in direct line-of-sight contact with places as far apart as Seattle, Thule (in Greenland), London, Rome, Cape Town, Buenos Aires, Los Angeles, and parts of Antarctica. As a never-setting variety of the famous Telstar satellite, it could serve as a permanent telephone or television relay station, linking North America to Europe, Africa, and Latin America.

Such a communications service would use microwaves—which can be beamed up to the synchronous satellite with the help of huge ground-based dish or horn antennas. The satellite itself need not have a directional antenna. It simply feeds the received signal into a solar-powered transmitter, and retransmits the amplified signal back to earth, on a different frequency.

Microwaves permit the use of a great number of adjacent frequencies, without cross talk. Thus a single synchronous satellite can handle many simultaneous telephone conversations and television programs.

Three synchronous communications satellites in the same orbit, spaced 120 degrees apart, could cover the entire earth (except for the areas around the North and South Poles, where all three satellites would be a trifle below the horizon).

Due to the satellites' enormous altitude, the travel time of the electronic signals from the earth's surface to the satellite and back will amount to almost one-third of a second. While this is immaterial for television, the time lag will be quite noticeable in telephone conversations. ■■

Dr. von Braun will consider answering questions from readers of POPULAR SCIENCE in the magazine, but he cannot undertake to answer each one by mail. Letters to him should be addressed in care of POPULAR SCIENCE, 355 Lexington Ave., New York, N.Y., 10017.

Oops!

FORUM

Newtonian gravity falls down

Moto Milgrom argues that hidden physics, not hidden mass, is needed to explain how galaxies move

COMMON belief has it that visible matter in the universe (stars, interstellar gas, and so on) constitutes only a small fraction (less than 10 per cent) of the total cosmic mass. The rest is accounted for in terms of hidden mass (or dark matter).

The notion that hidden mass exists follows inescapably if Newton's laws of gravity and dynamics are applied in the realm of the galaxies. A combination of Newton's second law and the law of gravity gives the acceleration produced by the gravitational force of a body (a galaxy, say) of mass M on an object (a star) at distance r from it. The acceleration is proportional to M and inversely proportional to the square of r. To predict the accelerations observed in many galaxies and clusters of galaxies, one requires masses a few times, or a few tens of times, larger than those observed.

We have no *a priori* reason to doubt the adequacy of the physical laws leading to the hidden mass hypothesis. Nevertheless, I have suggested (in a series of papers published in *The Astrophysical Journal* in 1983) that the large mass discrepancies observed in astronomical systems are not due to dark matter but to a breakdown of the Newtonian laws of dynamics. I doubt very much whether Newton himself would have put forth his laws in the form that is now known—and feign the hypothesis of hidden mass—if he had all the data we now have. His law was derived from data for the Solar System alone, and Newtonian dynamics have not been tested in any circumstances similar to those in galaxies.

What alternative description could replace Newtonian dynamics to explain the motion of both the Solar System and the galaxies? The alternative I have proposed, called MOND (for Modified Non-relativistic Dynamics), assumes that the Newtonian laws are a good approximation only for accelerations a, which are much greater than some critical acceleration constant a^*. At accelerations smaller than a^* it is the square of the accleration (instead of the acceleration itself) which is proportional to the mass of the pulling body and inversely proportional to the distance squared.

MOND leads to two critically important conclusions. First, the need to assume that hidden mass exists in galaxies disappears.

Secondly, although many systems of very different types were involved in the analysis, they could be explained with the one expression given above and only one constant a^* was determined from the data in a few independent ways, all of which led to a value of the critical acceleration some 10^{11} times smaller than the acceleration of a freely falling body on Earth.

Interestingly enough, this value very nearly equals the Hubble constant, a parameter related to the expansion of the Universe, times the speed of light. (Thus, a particle starting from rest and having this acceleration approaches the speed of light in the lifetime of the Universe). If this near equality is not just a chance coincidence, it probably points to a deep connection between local dynamics and global properties of the Universe. This has been the basis of Mach's principle, for example (*New Scientist*, 20/27 December 1984, p 12).

Hale Observatories

Falling apples may obey Newton's laws, but do rotating galaxies? If Newton's description is replaced, the need for hidden mass disappears

In addition, several other properties of galaxies follow as unavoidable consequences from MOND. The hidden mass hypothesis has so far had nothing to offer in the way of an explanation for any of these phenomena, but no known experimental result has so far been found to conflict with MOND.

MOND makes two types of predictions. Those which can be mimicked by hidden mass, and those which are incompatible with the hypothesis of hidden mass. The latter type, if verified (none has been tested yet), will rule out dark matter as an explanation of the mass discrepancy.

The predictions which have been considered so far fall into three categories. Some amount to saying that following Newtonian laws blindly will lead to the unacceptable result of negative hidden masses in some systems. Others contradict the hidden mass hypothesis, because they involve a breakdown of the strong equivalence principle. This says that gravity and acceleration are equivalent, and is the cornerstone of general relativity.

Because the theory of general relativity reduces to Newton's dynamics in the limit of low velocities (for all accelerations), it is inconsistent with MOND and will have to be amended if MOND turns out to be correct. We do not yet have a satisfactory relativistic theory incorporating MOND. The need for such a theory is particularly pressing, because without it we lack the tool to describe the Universe as a whole.

Whatever the outcome of this line of research, it is salutary to be reminded that alternatives to Newton's laws may be needed to explain the dynamics of large aggregates of matter. □

Science and the common man

Scientists are failing to get the message across, says Ted Nield

POPULAR debates touching upon science and morality often reveal far more about the public view of science than the matter in question. In recent weeks, the dilemma over *in vitro* fertilisation and embryological research has provided a perfect example. The media have fastened upon its potential for generating misplaced sympathy, and Enoch Powell has won the second reading of his Unborn Children (Protection) Bill—his bill of cellular rights.

A leading embryologist was being interviewed on the BBC's lunchtime news the day before the vote that gave Powell's bill its second reading. The need for research into the development of very early embryos was essential, he said. "But surely," the interviewer asked, "you must have done some research to get this far?" The professor nodded. "Well then," the interviewer said, "don't you know enough?"

which, if asked by a student, would cause that sense of thoracic implosion which is brought on by the realisation that *nothing has sunk in*. But what are the mistaken assumptions about science that lie behind such a question?

First, there is the common idea that science exists solely for the amassing of facts. People who secretly think this tend to use the expression "the sum total of human knowledge". Powell himself has used it in the House. Secondly, we find the belief that the number of such facts is finite, and that it is possible when you know, say, 80 per cent of them, to call a halt. And thirdly, one senses the feeling that theoretical embryology exists (or should exist) exclusively to allow doctors to perform *in vitro* fertilisation and use it to cure certain forms of infertility. Now that we can do it, the subject is closed. Science as means.

How sad all this is. How many scientists

a priori unknown, constant *a**. This

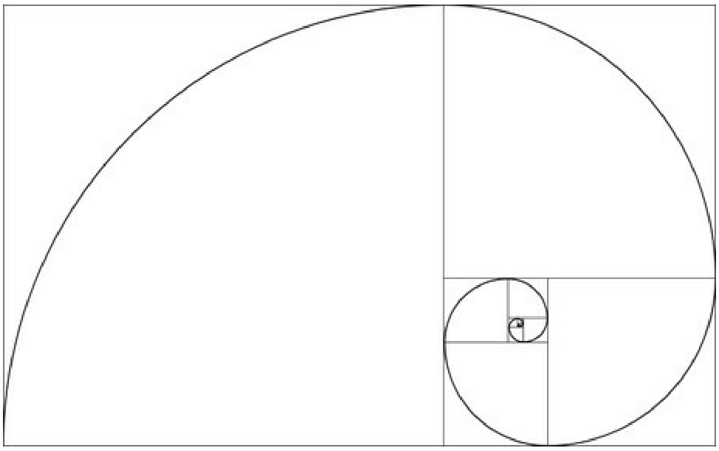
Moto Milgrom is a professor of astrophysics at the physics department of the Weizmann Institute, Rehovot, Israel.

Such a question would never occur to a scientist. And because scientists tend to mingle with other scientists, suddenly being asked it in a television studio is liable to leave them gobsmacked. It is a question

would there be, I wonder, if filling up the tank of facts were all there was to do? ▸

Dr Ted Nield observes and writes about science from a safe distance.

What Goes Up MUST Come Down:



All That Glitters is The Golden Rule

"Some of the greatest mathematical minds of all ages, from Pythagoras and Euclid in ancient Greece, through the medieval Italian mathematician Leonardo of Pisa and the Renaissance astronomer Johannes Kepler, to present-day scientific figures such as Oxford physicist Roger Penrose, have spent endless hours over this simple ratio and its properties. But the fascination with the Golden Ratio is not confined just to mathematicians. Biologists, artists, musicians, historians, architects, psychologists, and even mystics have pondered and debated the basis of its ubiquity and appeal. In fact, it is probably fair to say that the Golden Ratio has inspired thinkers of all disciplines like no other number in the history of mathematics"

For this Popular Science Article: click here

From UAH Salmon Library, Hunsville, Alabama: This is a 1955 (according to our records, no copyright notice existed for us to verify) video of von Braun discussing the expected challenges and concepts facing the United States in the future of space flight.

Wernher von Braun explains the possibility to reach the Moon. "Man and the Moon", Dec. 28, 1955

"Centrifugal Force : Dramatic demonstrations in Physics by Prof Julius Sumner Miller" below:

Centrifugal Force : Dramatic demonstrations in Physics by Prof Julius Sumner Miller VTS_08_1.avi

Below a video which shows what we should expect to happen were a person to somehow be put in orbit as NASA claims to have done many times over. We have to ignore the fact that the Space Station should have been flung into space like the stone from the proverbial sling, or spiral back towards Earth's center. We have to ignore that this is what we would demonstrate here on the Earth's surface, we would have no empirical reason to think we could put a man made object into this "mythical" orbit.

If it was possible to do so, somehow, and perhaps it is, we would still expect to see the effect below. The individual person or object on the Space Station would still be subject to centripetal/centrifugal action.

Understanding Centrifugl Force with demonstration Part 1 Physics

The International Space Station orbits the Earth once every 92 minutes or so. The velocity it is traveling is around 18,000 MPH.

As we have seen above, centrifugal force is not real. It is a fictitious force. Newton's first "law", is obeyed. Does the video below in any way resemble what we should expect as the space station itself should be subject to the same laws of inertia an object on Earth would.

The occupant of the Space Station should not be in a state of "free fall'. She would be like a particle of matter in a centrifuge. She should be stuck against the side of the Space Station that is furthest away from the Earth. Like the empirical evidence presented in the videos, above.

Yet she floats free as if in "Zero-G" She is in an accelerated state and we are supposed to believe somehow the law of inertia is suspended. This concept

would seem to be fantasy.

It seems odd to compare the satellite's fixed inertial velocity with gravity's accelerated effect on a body. Would not gravity's counted acceleration eventually over power the supposed fixed velocity of the projectile?

There is no experiment we can conduct in a lab that shows Newton's orbital mechanics at work. Any experiment we can do, will show centripetal and centrifugal (and Earth bound gravity) type effects at work. These very clear observations show us why there is a flaw in Newton's speculations regarding his notions of orbital mechanics.

see: The Principia: Mathematical Principles of Natural Philosophy

Some of Newton's reasoning is based on empirical data and some of it was clearly speculation.

We can begin to see why Einstein and company began to address the apparent conflict between the Galilean (linear inertial) existence we experience and the Newtonian heliocentric centripetal/centrifugal mathematical model, with the theory of General Relativity. This is a subject for a future set of articles.

NASA illustrates Newton:

NASA International Space Station footage below:

HOW IT WORKS The International Space Station

The Science of Conflicting Explanations:

Forces vs Forces: Centrifugal vs Falling Around The Earth, *One or the The Other or Both?*

Introduction to Planetary Science: The Geological Perspective *By Gunter Faure, Teresa M. Mensing*

A Spacecraft in Orbit Around a Planet

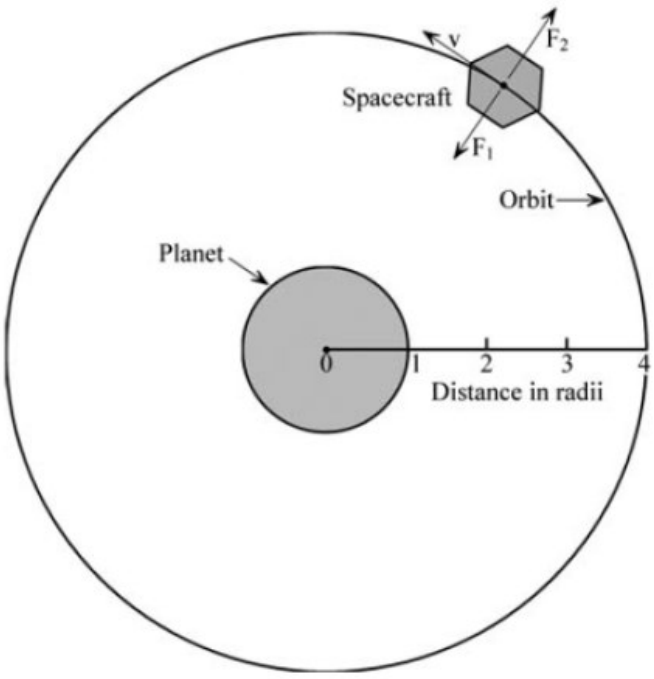


Figure 1.7. Forces acting on a spacecraft or satellite that is "in orbit" around a planet. The velocity (v) of the spacecraft generates a centrifugal force (F_2) which must be equal in magnitude but opposite in direction to the gravitational force (F_1). When $F_1 = F_2$, the spacecraft is in a stable circular orbit above the surface of the planet. When the velocity (v) decreases, F_2 decreases, whereas F_1 remains constant. Consequently, the radius of the orbit decreases which causes F_1 to increase as the spacecraft approaches the surface of the planet in accord with Figure 1.6. When a spacecraft

descends to a lower circular orbit, its velocity must increase in order to raise the centrifugal force sufficiently to balance the increase in the gravitational force. (See Science Brief 1.5.2 and 1.5.3)

Gravity is supposed to be like an invisible string holding the Space Station so it continues to follow a circular path around the larger mass of the Earth.

If this is the case then why wouldn't the astronauts on the Space Station experience the same 90% or so gravitational force that holds the station in its circular orbit, or the centrifugal force that would seem to be the natural result of such motion?

If 'centrifugal force' exactly counteracts the effect of Earth's gravity, so the occupants of the Space Station can float as if in "Zero-G", then why does this same explanation not apply to the space station itself?

The concept is that the Space Station and the Astronauts are all falling around the Earth in a free fall.

Why does the Space Station stay in orbit around the Earth if it can ignore the effect of Earth's gravity due to the Space Station's (relative) linear or perpendicular motion?

If we assume Newton's model correct, and the imagined projectile follows the circular, orbital path, wouldn't inertia in the form of 'centrifugal force' apply? Would this not cause our projectile to ignore some of the pull of gravity and thus not actually follow an orbit around the Earth?

Assuming a projectile at the Earth's equator (sans atmosphere) and a velocity of 7.9 m/sec (some 17,672 mph). Would not the projectile not be subject to centrifugal effect and would this not mean that the gravitational pull would be less than the 9.8 m/sec one would expect? Would this not create a sort of 'lift' away from the Earth's surface at an ever increasing velocity?

PROPOSITION IV. THEOREM IV.

That the moon gravitates towards the earth, and by the force of gravity is continually drawn off from a rectilinear motion, and retained in its orbit.

The mean distance of the moon from the earth in the syzygies in semi-diameters of the earth, is, according to *Ptolemy* and most astronomers, 59; according to *Vendelin* and *Huygens*, 60; to *Copernicus*, $60\frac{1}{3}$; to *Street*, $60\frac{2}{5}$; and to *Tycho*, $56\frac{1}{2}$. But *Tycho*, and all that follow his tables of refraction, making the refractions of the sun and moon (altogether against the nature of light) to exceed the refractions of the fixed stars, and that by four or five minutes *near the horizon*, did thereby increase the moon's *horizontal* parallax by a like number of minutes, that is, by a twelfth or fifteenth part of the whole parallax. Correct this error, and the distance will become about $60\frac{1}{2}$ semi-diameters of the earth, near to what others have assigned. Let us assume the mean distance of 60 diameters in the syzygies; and suppose one revolution of the moon, in respect of the fixed stars, to be completed in $27^{d}.\ 7^{h}.\ 43'$, as astronomers have determined; and the circumference of the earth to amount to 123249600 *Paris* feet, as the French have found by mensuration. And now if we imagine the moon, deprived of all motion, to be let go, so as to descend towards the earth with the impulse of all that force by which (by Cor. Prop. III) it is retained in its orb, it will in the space of one minute of time, describe in its fall $15\frac{1}{12}$ *Paris* feet. This we gather by a calculus, founded either upon Prop. XXXVI, Book I, or (which comes to the same thing) upon Cor. 9, Prop. IV, of the same Book. For the versed sine of that arc, which the moon, in the space of one minute of time, would by its mean

see: https://archive.org/stream/newtonspmathema00newtrich#page/n395/mode/2up

motion describe at the distance of 60 semi-diameters of the earth, is nearly $15\frac{1}{12}$ *Paris* feet. or more accurately 15 feet, 1 inch, and 1 line $\frac{4}{9}$. Wherefore, since that force, in approaching to the earth, increases in the reciprocal duplicate proportion of the distance, and, upon that account, at the surface of the earth, is 60 × 60 times greater than at the moon, a body in our regions, falling with that force, ought in the space of one minute of time, to describe 60 × 60 × $15\frac{1}{12}$ *Paris* feet; and, in the space of one second of time, to describe $15\frac{1}{12}$ of those feet; or more accurately 15 feet, 1 inch, and 1 line $\frac{4}{9}$. And with this very force we actually find that bodies here upon earth do really descend; for a pendulum oscillating seconds in the latitude of *Paris* will be 3 *Paris* feet, and 8 lines $\frac{1}{2}$ in length, as Mr. *Huygens* has observed. And the space which a heavy body describes by falling in one second of time is to half the length of this pendulum in the duplicate ratio of the circumference of a circle to its diameter (as Mr. *Huygens* has also shewn), and is therefore 15 *Paris* feet, 1 inch, 1 line $\frac{7}{9}$. And therefore the force by which the moon is retained in its orbit becomes, at the very surface of the earth, equal to the force of gravity which we observe in heavy bodies there. And therefore (by Rule I and II) the force by which the moon is retained in its orbit is that very same force which we commonly call gravity; for, were gravity another force different from that, then bodies descending to the earth with the joint impulse of both forces would fall with a double velocity, and in the space of one second of time would describe $30\frac{1}{6}$ *Paris* feet; altogether against experience.

This calculus is founded on the hypothesis of the earth's standing still; for if both earth and moon move about the sun, and at the same time about their common centre of gravity, the distance of the centres of the moon and earth from one another will be $60\frac{1}{2}$ semi-diameters of the earth; as may be found by a computation from Prop. LX, Book I.

CREATING A NEW MATH

"It was during his plague-induced isolation that the first written conception of Fluxionary Calculus was recorded in the unpublished De Analysi per Aequationes Numero Terminorum Infinitas. In this paper, Newton determined the area under a curve by first calculating a momentary rate of change and then extrapolating the total area. He began by reasoning about an indefinitely small triangle whose area is a function of x and y. He then reasoned that the infinitesimal increase in the abscissa will create a new formula where x = x + o (importantly, o is the letter, not the digit 0). He then recalculated the area with the aid of the binomial theorem, removed all quantities containing the letter o and re-formed an algebraic expression for the area. **Significantly, Newton would then "blot out" the quantities containing o because terms "multiplied by it will be nothing in respect to the rest"**.

"At this point Newton had begun to realize the central property of inversion. He had created an expression for the area under a curve by considering a momentary increase at a point. In effect, the fundamental theorem of calculus was built into his calculations. While his new formulation offered incredible potential, Newton was well aware of its logical limitations at the time. He admits that "errors are not to be disregarded in mathematics, no matter how small" and that what he had achieved was "shortly explained rather than accurately demonstrated."

https://en.wikipedia.org/wiki/History_of_calculus#Newton

Apples & Oranges

The problem would seem to be that gravity is an accelerated 'force' and inertia is considered to be a linear motion with a constant (*unchanging*) velocity. Newton relies on gravity to explain an orbit itself.

Newton's theory relies on the concept that a body would fall towards the center of the Earth at exactly the the same distance it gains from its supposed inertial motion along an imagined linear path. The projectile would have ended up at a higher altitude above the Earth due to its linear motion but this position is modified by gravity itself so the projectile ends up orbiting at a constant distance from Earth's center.

Yet gravity accelerates an object. The projectile would fall at a rate of 9.8 meters per second for the first second only, after that its velocity continues to increase by this amount. every second, unlike the perpendicular velocity, which is by definition, constant. This would seem to be a huge problem and shows the fallacy in Newton's reasoning.

Time= 1 second Distance Fallen = 4.9 meters @ Velocity = 9.8 meters/second

Time= 2 seconds Distance Fallen = 19.6 meters @ Velocity = 19.6 meters/second

Time= 3 seconds Distance Fallen = 44.1 meters @ Velocity = 29.4 meters/second

Time= 4 seconds Distance Fallen = 78.4 meters @ Velocity = 39.2 meters/second

Time= 5 seconds Distance Fallen = 123 meters @ Velocity = 49.0 meters/second

http://www.physicsclassroom.com/class/1DKin/Lesson-5/How-Fast-and-How-Far

Since gravity causes the body to continue to increase in velocity, would this not mean that even Newton's imagined projectile must also fall back to the Earth eventually?

***The Problem with Newton's Concept*:**

In the illustration below, we have Newton's orbital theory depicted for us. The initial 4.9 meter drop would then be followed by a drop of some 14.7 meters, and so on, as we can see from the calculations above. The projectile would then be unable to maintain any kind of orbit. It would experience a continued increasing pull until it crashed into the Earth's surface, by this reasoning.

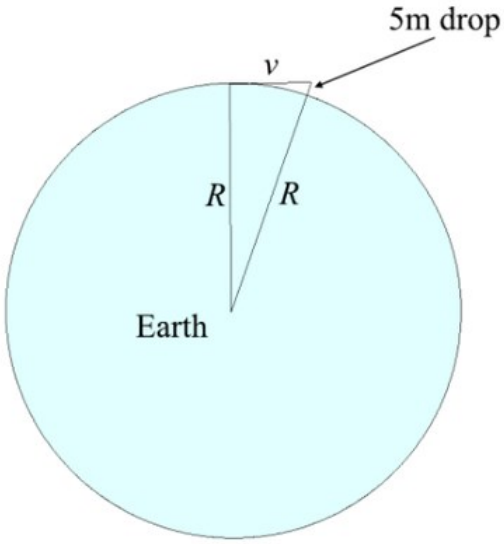


Figure 2.5: Cannonball in orbit.

The radius of the Earth is 6400 km = 6,400,000 m. From Pythagoras' theorem (1.14.1) we can therefore say that

$$(R+5)^2 = v^2 + R^2$$

$$R^2 + 25 + 10R = v^2 + R^2.$$

25 m is a lot smaller than $R = 6{,}400{,}000$ m, so we'll ignore it, giving

$$v^2 = 10R = 10 \times 6{,}400{,}000 = 64{,}000{,}000$$

$$v = 8000\,\mathrm{m}.$$

see: A Most Incomprehensible Thing: Notes Towards a Very Gentle Introduction to the Mathematics of Relativity

Apples & The Moon:

> *"So why does the Moon orbit the Earth?*
> *If the Moon is falling a little towards the Earth, just like an apple dropped on the surface, why does the Moon travel around the Earth in an orbit instead of falling onto it?*
>
> > *The way to answer this question is to first consider what would happen if there was no gravity acting:*
> > *Question:*
> > *How far would the Moon travel in a straight line in 1 second if there were no gravity acting?*
> >
> > *Answer:*
> > *About 1000 meters.*
> > *At the same time, the Moon's motion along this straight-line path would also cause it to move away from the Earth.*
> > *Question:*
> > *How far away from the Earth would the Moon move in 1 second if no gravity were acting?*
> >
> > *Answer:*
> > *About 0.00136 meters!*
>
> *In round numbers, the amount the Moon falls towards the Earth due to gravity is just enough to offset the straight-line path it would take if gravity were not acting to deflect it. This balance effectively closes the loop."*

see: http://www.astronomy.ohio-state.edu/~pogge/Ast161/Unit4/gravity.html

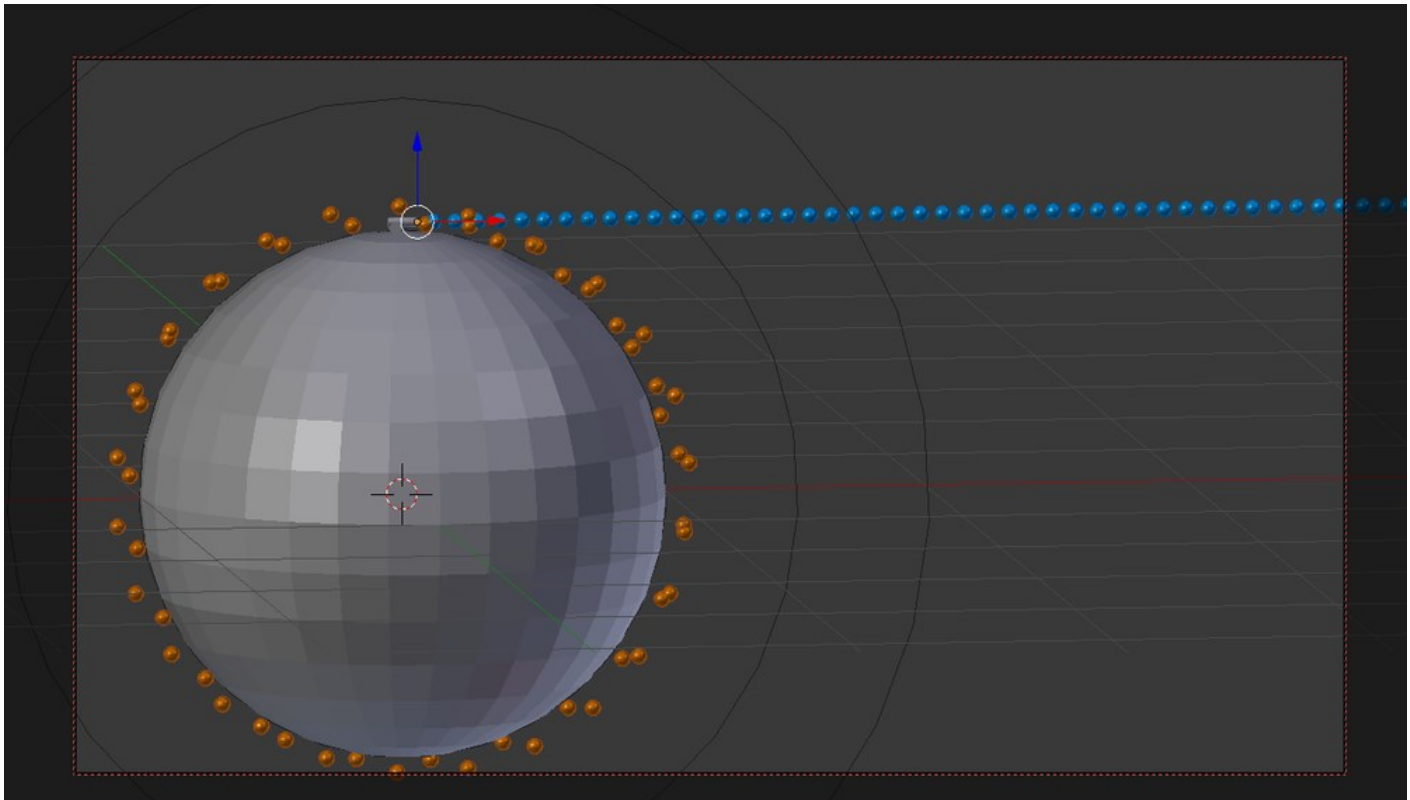
See a problem?

Gravity accelerates the body while the straight line path supposes a fixed velocity. As time passes the acceleration due to gravity will continue to increase while the supposed inertial velocity does not. Or are we to suppose that this velocity is actually better defined as an acceleration?

The Moon would fall faster towards the Earth as time passed. Its inertial velocity will not be able to continue to compensate for the pull of gravity, or so it would seem.

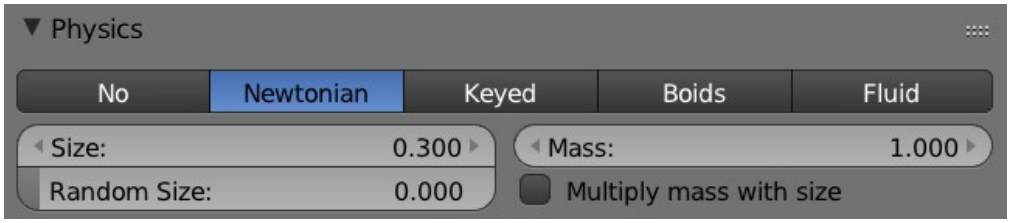
The Moon MUST always move away from the Earth at a fixed velocity of 0.00136 meters (in one second), YET the Moon must also fall towards the Earth at an ever increasing rate. After another second of time passes, the Moon should be falling faster towards the Earth and this increased velocity cannot now be balanced by the inertial motion of the Moon (0.00136 meters a second)

It's Only a Model

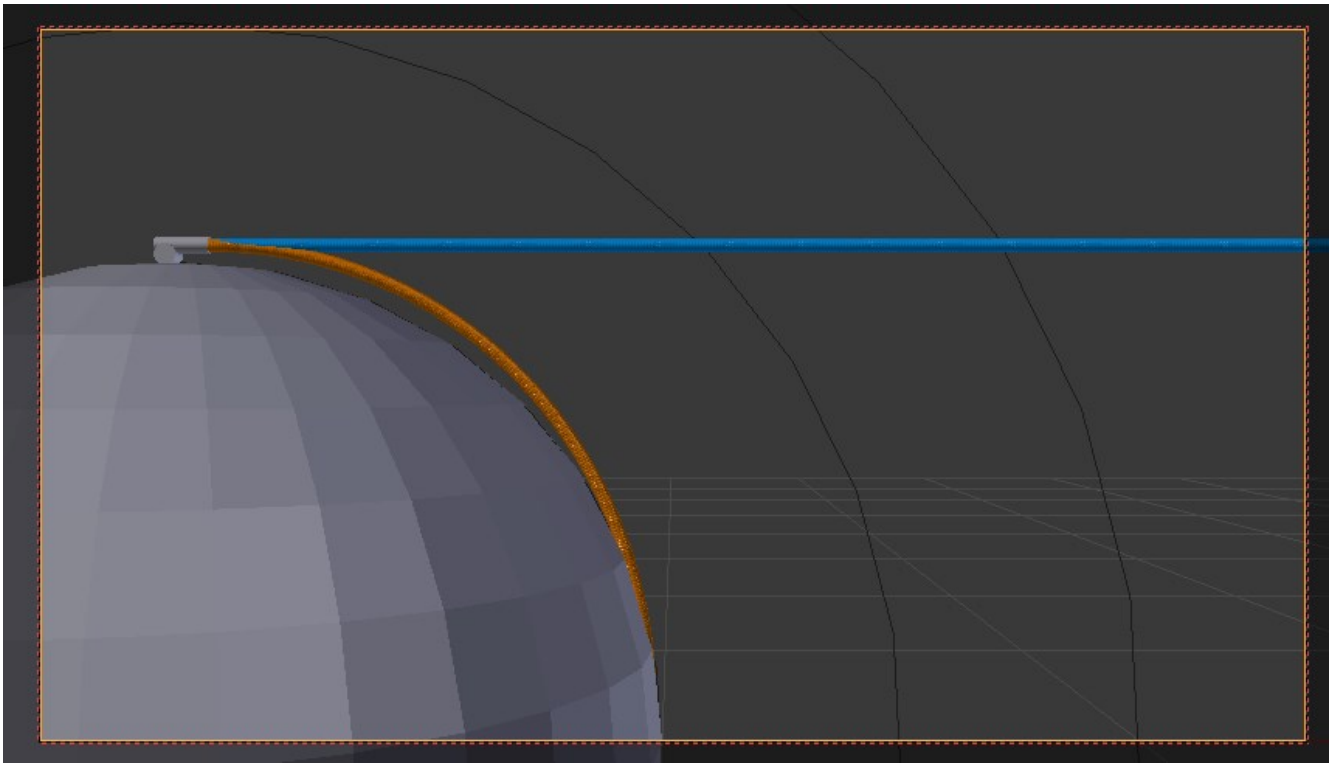


PLEASE NOTE: This Blender™ 3D simulation DOES NOT make use of any real values and is for illustrative purpose only.

Newtonian Mechanics demonstrated with free 3d software Blender™.



What we would actually witness. The cannon ball ends up crashing back into the Earth and cannot achieve an orbit, illustrated below.

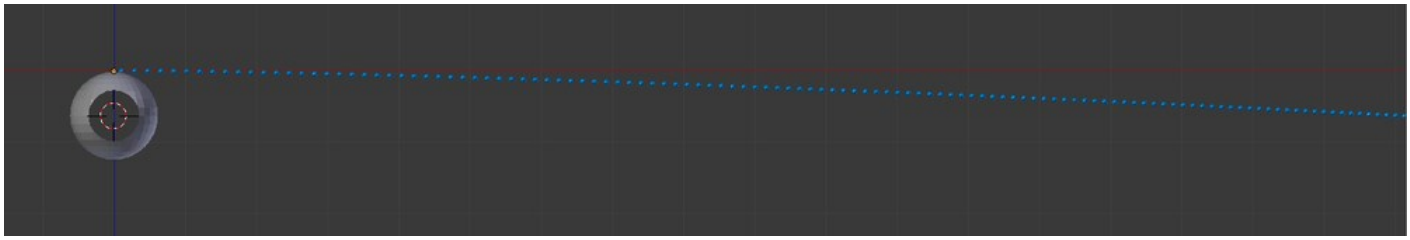


PLEASE NOTE: This Blender™ 3D simulation DOES NOT make use of any real values and is for illustrative purpose only.

An Orbit is an Accelerated Frame

Under such conditions would we not expect inertia in the form of 'centrifugal force' to appear? Would not such force effect the orbit itself or at the very least the passengers of the Space Station? Shouldn't the astronauts be like particles in a centrifuge? How can an object whip around the Earth at some 18,000 mph and the occupants act as if they were in a motionless Zero Gravity Environment or supposed 'free fall' ?

Does This Look Like an Orbit?



ABOVE: This is what it looks like when we attempt to model Newton's thought experiment with scaled down real world values. (Projectile velocity of 79 m/s instead of 7.9 km/s and the gravitational force value for the sphere is -.098 m/sec instead of -9.8 m/sec) 7.9 km = 7900 m. 79 is 1/100th of 7900 and .098 is 1/100th of 9.8.

The further away the imagined projectile gets from the Earth's center of mass, the weaker the pull of gravity is, so it travels further, eventually it would slow and swing back like a pendulum, resulting in a back and forth type acceleration, or the projectile would continue its journey away from the Earth. This is not how Newton envisioned orbital mechanics working.

Let's Do The Math:

A Little Bit of Gravity Math:

"The first equation shows that, after one second, an object will have fallen a distance of 1/2 × 9.8 × 12 = 4.9 meters. After two seconds it will have fallen 1/2 × 9.8 × 22 = 19.6 meters; and so on. The second to last equation becomes grossly inaccurate at great distances. If an object fell 10,000 meters to Earth, then the results of both equations differ by only 0.08%; however, if it fell from geosynchronous orbit, which is 42,164 km, then the difference changes to almost 64%."

The equations [edit]

Distance d travelled by an object falling for time t:	$d = \frac{1}{2}(g * t^2)$
Time t taken for an object to fall distance d:	$t = \sqrt{\frac{2d}{g}}$
Instantaneous velocity v_i of a falling object after elapsed time t:	$v_i = gt$
Instantaneous velocity v_i of a falling object that has travelled distance d:	$v_i = \sqrt{2gd}$
Average velocity v_a of an object that has been falling for time t (averaged over time):	$v_a = \frac{1}{2}gt$
Average velocity v_a of a falling object that has travelled distance d (averaged over time):	$v_a = \frac{\sqrt{2gd}}{2}$
Instantaneous velocity v_i of a falling object that has travelled distance d on a planet with mass M, with the combined radius of the planet and altitude of the falling object being r, this equation is used for larger radii where g is smaller than standard g at the surface of Earth, but assumes a small distance of fall, so the change in g is small and relatively constant:	$v_i = \sqrt{\frac{2GMd}{r^2}}$
Instantaneous velocity v_i of a falling object that has travelled distance d on a planet with mass M and radius r (used for large fall distances where g can change significantly):	$v_i = \sqrt{2GM\left(\frac{1}{r} - \frac{1}{r+d}\right)}$

"During the first 0.05s the ball drops one unit of distance (about 12 mm), by 0.10s it has dropped at total of 4 units, by 0.15s 9 units, and so on."

https://en.wikipedia.org/wiki/Equations_for_a_falling_body

Doing The Math:

Velocity Formula:

v = g * t

Distance Formula:

d = 0.5 * g * t2

see: http://www.physicsclassroom.com/class/1DKin/Lesson-5/How-Fast-and-How-Far

Orbiting at Earth's surface (equator) SPEED: 7.9 km/s (17,672 mph)

see: https://en.wikipedia.org/wiki/Orbital_speed#Precise_orbital_speed

"The gravity of Earth, which is denoted by g, refers to the acceleration that the Earth imparts to objects on or near its surface due to gravity. In SI units this acceleration is measured in metres per second squared (in symbols, m/s2 or m·s−2) or equivalently in newtons per kilogram (N/kg or N·kg−1). It has an approximate value of 9.8 m/s2, which means that, ignoring the effects of air resistance, the speed of an object falling freely near the Earth's surface will increase by about 9.8 metres (32 ft) per second every second, this quantity is sometimes referred to informally as little g (in contrast, the gravitational constant G is referred to as big G)."

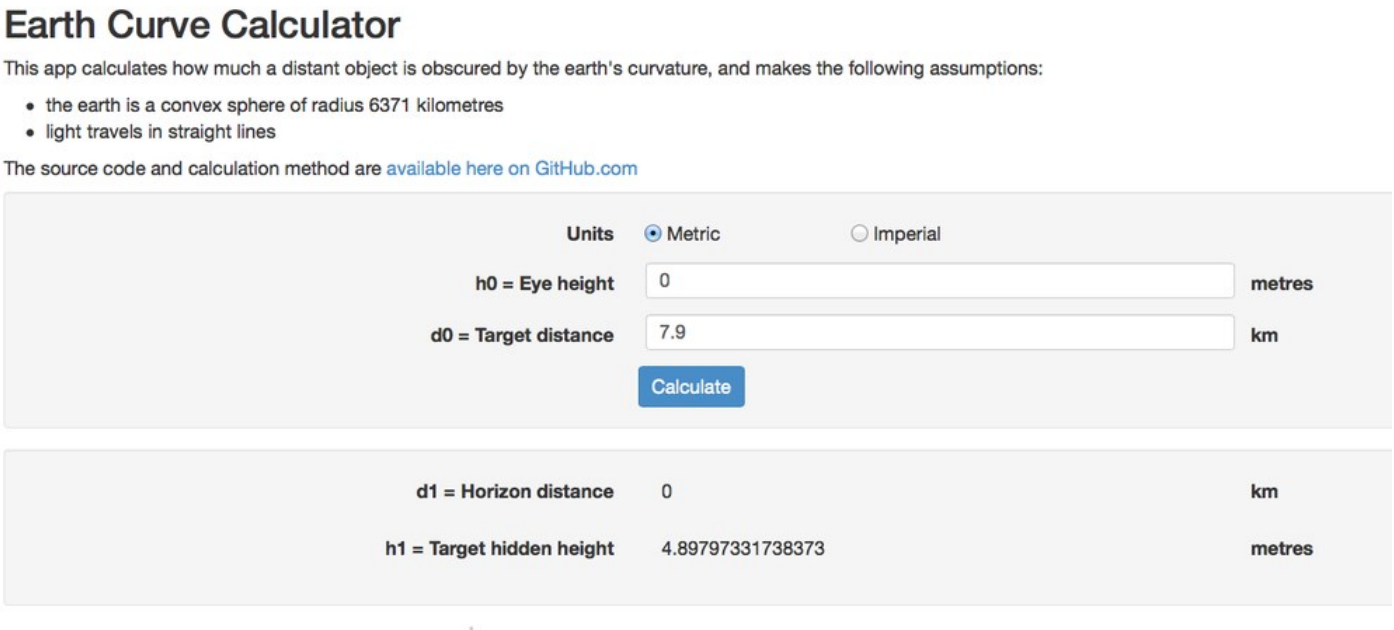
see: https://en.wikipedia.org/wiki/Gravity_of_Earth

inertia:
7.9 km = 7900 meters per second orbital velocity at Earth equatorial surface
7900/10= 790 meters in one tenth of a second is the inertial speed (constant velocity).
VS

gravity:
(d = 0.5 x g x t2)
0.5 x 9.8 m/sec2 x (.10 x .10)= 0.049 meters in one tenth of a second

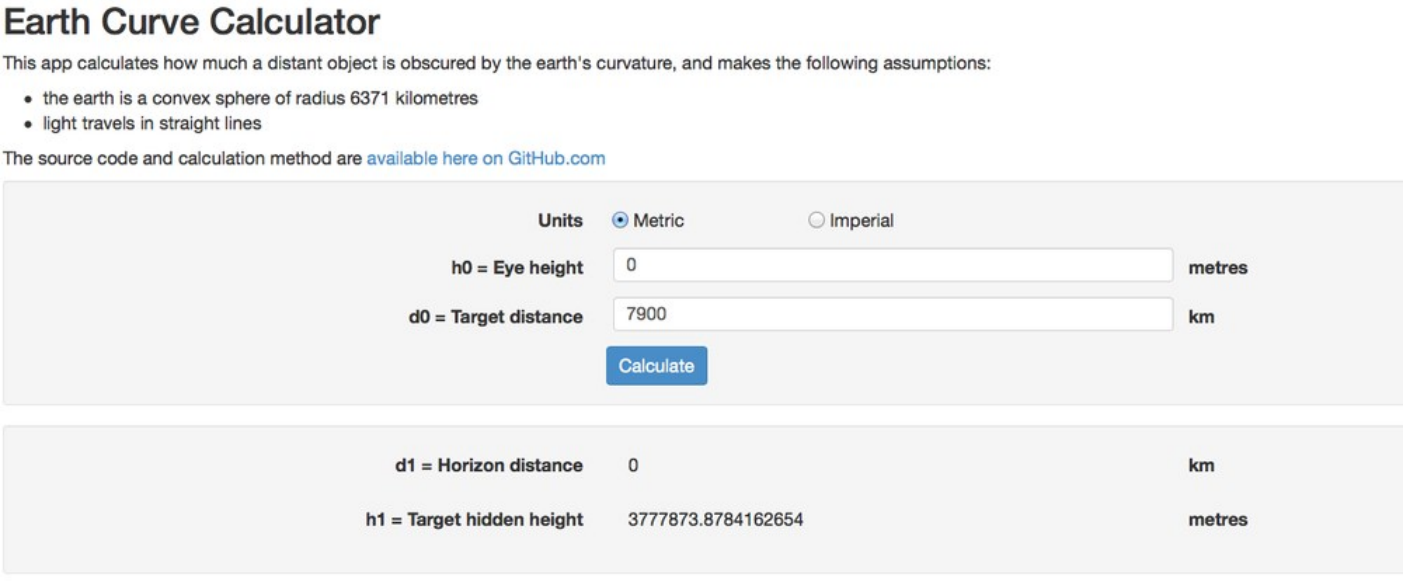
0.048979752136801835 Meters For 790m

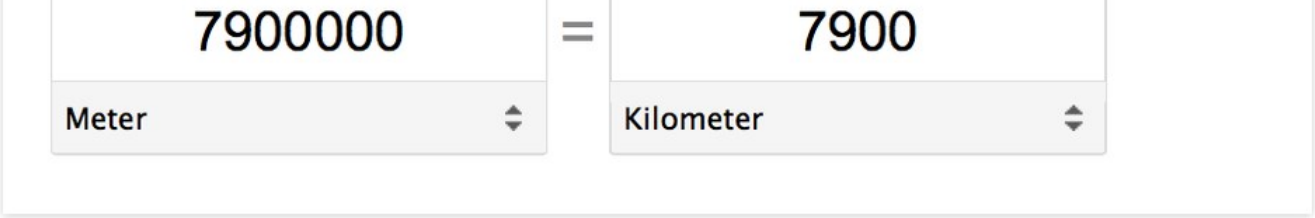
Please Take Notice How Any Minor Differences in The Math is Hand Waved Away, Despite The Fact That Such Minor Differences Would Compound to Become A MAJOR PROBLEM (or so it would seem)



One Second Time = 4.89797331738373 meters for the inertial motion and 4.9 meters for gravity

see: https://dizzib.github.io/earth/curve-calc/ for online calculator to use





The Answer Would Seem To Be That The Earth is A Globe

The spherical shape of the Earth and its gravitational pull create an accelerated frame despite the assumed inertia of the body in orbit. This brings up the concept of centrifugal force and how this model would seem to be one that would indeed cause such an inertial force to arise. This of course is what we can demonstrate here on Earth. Either the object would fall back or move away, there would be no in between ‘sweet spot’ based on these ideas and this model.

Galilean inertial frames rely on the idea of a linear frame of reference, this provides the linear inertia frame. Sir Isaac Newton makes use of the there dimensional globe and now we can see we would have to deal with centrifugal force. The astronauts on the Space Station should then be subject to inertia in the form of what we would term ‘centrifugal force’. The Space Station itself should as well. It should be either flung away from the Earth in some manner or drawn towards it. There is no supposed "medium" to support the space station's motion other than Newtonian mechanics, which are mathematical constructs.

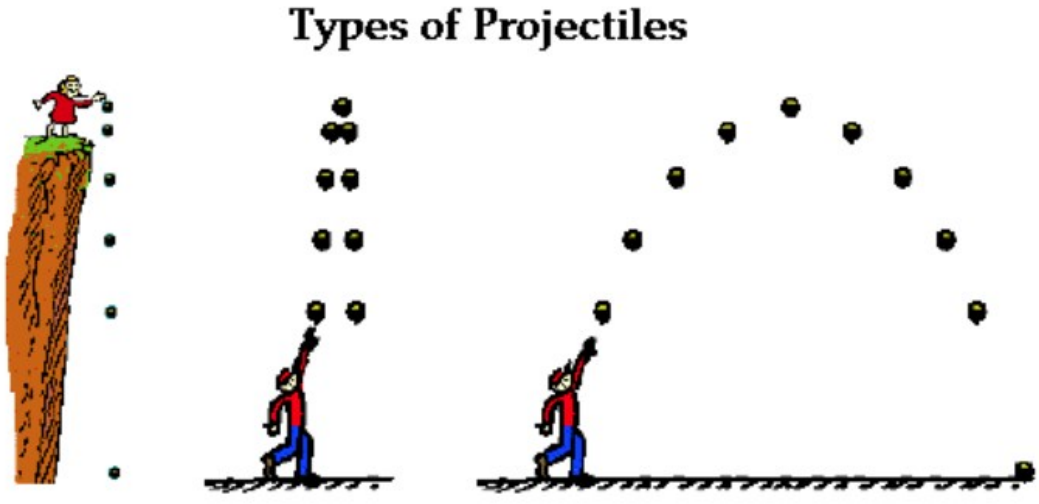
https://en.wikipedia.org/wiki/Inertial_frame_of_reference

ASSUMPTION WARNING AHEAD:

Light Travels in Straight Lines Unaffected by Gravity, Don't Tell Einstein!

https://dizzib.github.io/earth/curve-calc/

Looking Past The Horizon:

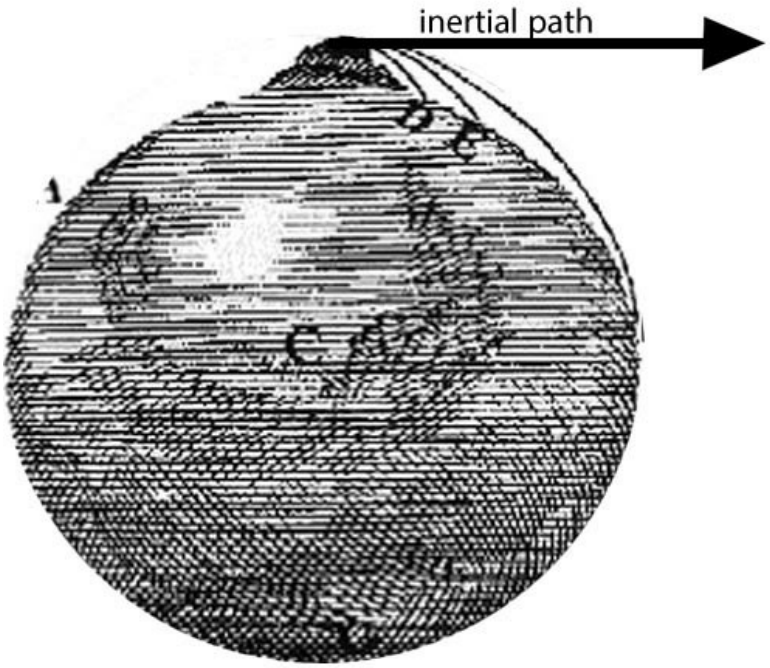


By definition, a projectile has only one force acting upon – the force of gravity. If there were any other force acting upon an object, then that object would not be a projectile. Thus, the free-body diagram of a projectile would show a single force acting downwards and labeled "force of gravity" (or simply Fgrav). This is to say that regardless of whether a projectile is moving downwards, upwards, upwards and rightwards, or downwards and leftwards, the free-body diagram of

the projectile is still as depicted in the diagram at the right. By definition, a projectile is any object upon which the only force is gravity.

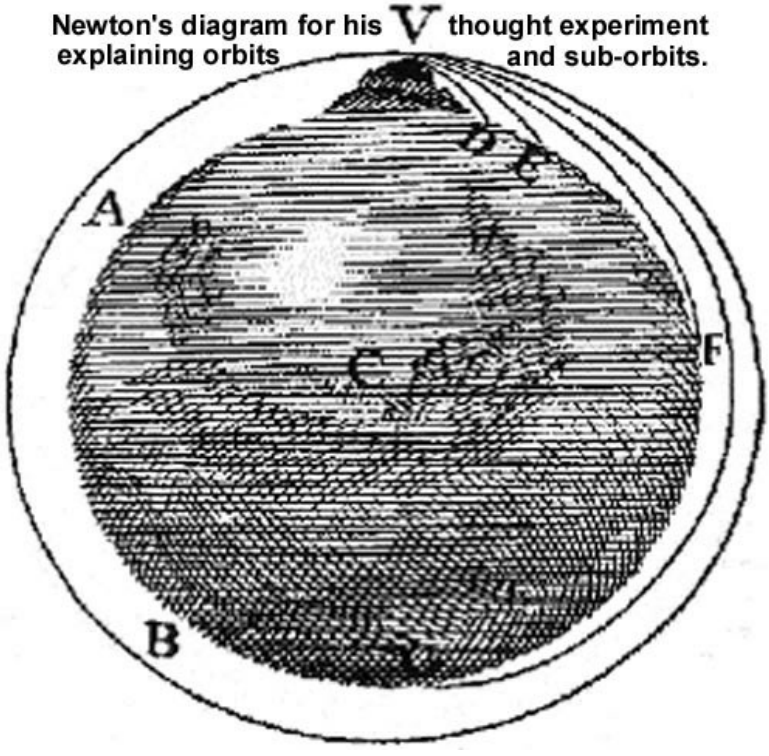
from: http://www.bsu.edu/eft/sandlot/p/class_linear.html

see also: http://www.physicsclassroom.com/Class/vectors/u3l2a.cfm



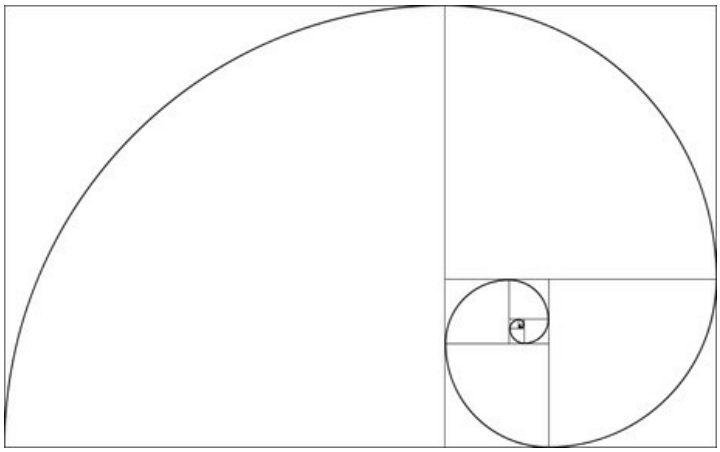
Above illustration:

The inertial path brings the imagined projectile to higher and higher altitude were it not for the force we term 'gravity'. In order to perform Newton's thought experiment, one would have to aim there cannon 'high' rather than at a point which would be at an equal distance from the Earth's center as the cannon.



The Origin of Calculus

"Newton came to calculus as part of his investigations in physics and geometry. He viewed calculus as the scientific description of the generation of motion and magnitudes. In comparison, Leibniz focused on the tangent problem and came to believe that calculus was a metaphysical explanation of change. Importantly, the core of their insight was the formalization of the inverse properties between the integral and the differential of a function. This insight had been anticipated by their predecessors, but they were the first to conceive calculus as a system in which new rhetoric and descriptive terms were created. [19] Their unique discoveries lay not only in their imagination, but also in their ability to synthesize the insights around them into a universal algorithmic process, thereby forming a new mathematical system."



GRAVITY : AN ACCELERATED PROCESS

Time= 1 second Distance Fallen = 4.9 meters @ Velocity = 9.8 meters/second

Time= 2 seconds Distance Fallen = 19.6 meters @ Velocity = 19.6 meters/second

Time= 3 seconds Distance Fallen = 44.1 meters @ Velocity = 29.4 meters/second

Time= 4 seconds Distance Fallen = 78.4 meters @ Velocity = 39.2 meters/second

Time= 5 seconds Distance Fallen = 123 meters @ Velocity = 49.0 meters/second

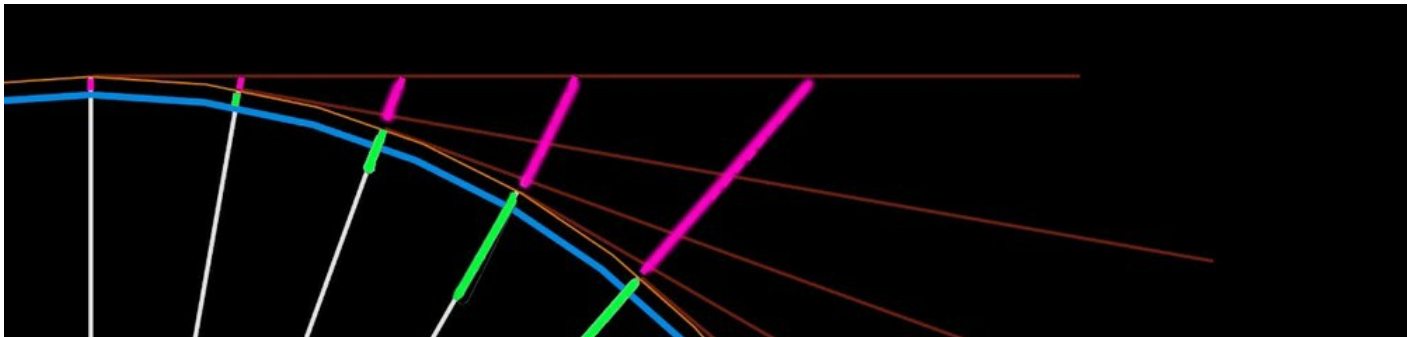
http://www.physicsclassroom.com/class/1DKin/Lesson-5/How-Fast-and-How-Far

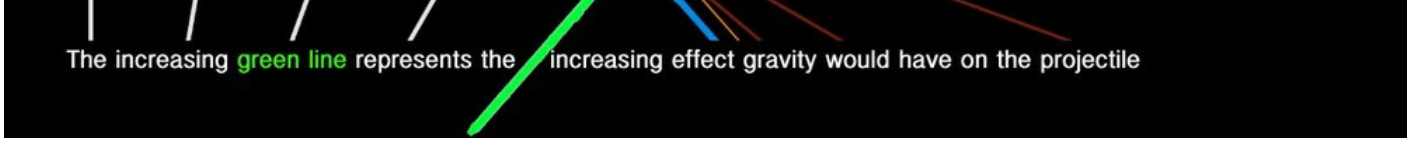
Newton's concept would seem to rely on comparing a linear and fixed velocity to an accelerated one. This imagined linear motion is represented by the dark red lines in the illustration below. The magenta lines represent the increasing 'pull' of gravity compared to the imagined inertial path. The green lines represent the actual 'pull' of gravity a projectile would experience since it never actually follows the dark red path.

The imagined projectile is supposed to be in orbit following the orange (circular) path.

The gravitational pull that prevents the imagined cannonball from flying off in a straight line would continue to increase and would 'pull' the projectile down from the orange circular orbital path along the green path, causing the projectile to move closer and close to the Earth. The way Newton imagines his thought experiment, the accelerated (IE increasing) force of gravity is always somehow balanced out by the constant velocity of the projectile as if the projectile had followed the linear path and had been allowed to ascend to that relative altitude away from the Earth, where it would presumably experience that much less gravitational pull, allowing it to move that much further away.

He makes use of the initial gravitational velocity and then ignores that fact that this velocity would keep increasing. It is as if he imagines the cannonball in two places or rather existences, at once, in one 'frame of reference' or 'universe' the cannon ball followed the dark red straight line path and Newton then can use this parameter in his equations when he calculates what would happen to the cannonball in his other 'frame of reference' (or universe) where the cannonball followed the orange circular orbital path. In other words, mathematically Sir Isaac can have his cake and eat it too.





"Newton's theory can accurately predict gravitational orbits because it allows us to determine the acceleration of an object in a gravitational field. Acceleration is the rate of change of an object's velocity.

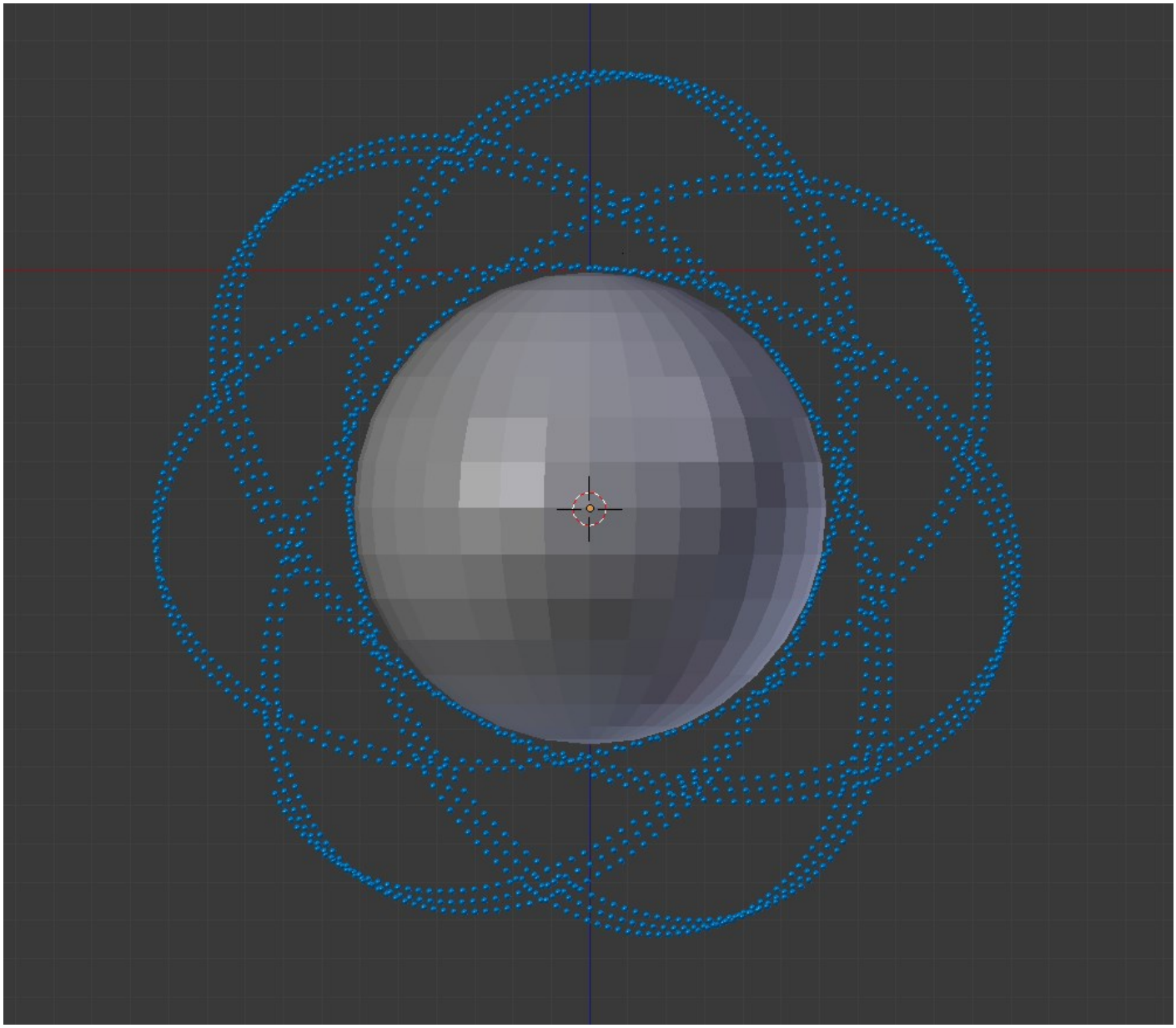
- *If we know the initial position and velocity of an object, knowing its acceleration at all later times is enough to completely determine its later path of motion.*

  To predict the path, we simply substitute Newton's expression for Fgrav for the force term in his Second Law and solve for acceleration.

  - *But there is a major complication. The Second Law is not a simple algebraic expression. Both velocity and acceleration are rates of change (of position and velocity, respectively). Mathematically, they are derivatives. The gravitational force also changes with position. Finally, velocity, acceleration and the gravitational force all have a directionality as well as a magnitude associated with them. That is, they are "vectors".*

    So the Second Law is really a differential vector equation. To solve it, Newton had to invent calculus."

http://www.faculty.virginia.edu/rwoclass/astr1210/guide08.html



It Would Be More Like a Pendulum or Child's Swing, it would seem that the supposed orbit would not result in some kind of imagined 'free fall' or 'zero-g' environment.

Some Thoughts

Sir Isaac Newton's "brilliant" concept would seem to be nothing but an example of very clever (& literally) circular reasoning, supported by impressive mathematical formula. Prior to the post World War Two Space Race era, before the mid Twentieth Century, no one could claim there was an experiment that could be conducted that could show Sir Isaac Newton and company were correct.

Can man actually achieve the fantastic velocities needed to achieve the orbits Newton imagined?

Shouldn't the astronauts on the Space Station be like particles in a centrifuge? How can an object whip around the Earth at some 18,000 mph and the occupants act as if they were in a motionless Zero Gravity Environment or supposed 'free fall'? Newton's concept would place the projectile in an extreme state of acceleration at an extremely fantastic speed, inertia should manifest as the phenomena known as 'centrifugal force'.

Newton's concept seems to ignore the motion of the Earth and how this would effect the gravitational relationship between the imagined projectile and the Earth itself. The cannon ball would have to magically follow along with the Earth, otherwise we'd expect it would no longer be tethered to the Earth as a result of these compounded motions.

This all predates Einstein, obviously, as well as predating the concept that the Sun itself is in motion. Newton's theory predates the discovery of galaxies and his conception relies on a motionless Sun, around which the planetary bodies orbited.

Unlike the modern mainstream idea, Newton's model of Earth is not quite comparable to the Sun, as the Sun was considered motionless. His famed cannonball thought experiment then, by his own reasoning, could not be a "universal truth" as the Earth was considered to be moving around the Sun.

It would seem to make more sense if Newton supposed a motionless Earth with the bodies orbiting it. We must keep in mind that the mainstream cosmological model of today is not the heliocentric model of Newton's time.

There is a considerable difference between demonstrating a theory with a mathematical model and demonstrating a theory with a physical experiment. Sir Isaac's Newton's 'genius' would seem to have to do with the fact that he was able to demonstrate his theory with flawed math.

Full Disney Educational "Man in Space" (1958), below:

Disney Educational Video "Man In Space" 1955

***Reel* impossible physics from Skylab:**

Jogging in weightlessness?Jogging or running or walking in this "Zero G" environment is impossible. There is no 'force' to pull or push the astronaut's body back towards the apparent 'floor'.

NASA & THE ART OF SPECIAL FX

Space station artificial gravity is tested in a centrifuge of the type seen in "2001: A Space Odyssey" at NASA Langley Research Center. Two different rotation rates simulate one-tenth gravity (0.1 G, station rotating at about 4 rpm) and one-half gravity (0.5 G, station rotating at about 9 rpm).

2001 Space Odyssey Centrifuge Loop

Zoran Perisic He is an inventor and holder of several patents on Front-Projection and 3-D Cinematograph.

No Artificial Satellites Needed: Nikola Tesla Explains The ionosphere

"The earth is 4,000 miles radius. Around this conducting earth is an atmosphere. The earth is a conductor; the atmosphere above is a conductor, only there is a little stratum between the conducting atmosphere and the conducting earth which is insulating. . . . Now, you realize right away that if you set up differences of potential at one point, say, you will create in the media corresponding fluctuations of potential. But, since the distance from the earth's surface to the conducting atmosphere is minute, as compared with the distance of the receiver at 4,000 miles, say, you can readily see that the energy cannot travel along this curve and get there, but will be immediately transformed into conduction currents, and ***these currents will travel like currents over a wire with a return****. The energy will be recovered in the circuit, not by a beam that passes along this curve and is reflected and absorbed, . . . but it will travel by conduction and will be recovered in this way. "*

The True Wireless Art

[Nikola Tesla On His Work With Alternating Currents and Their Application to Wireless Telegraphy, Telephony, and Transmission of Power, Leland I. Anderson, Editor, Twenty First Century Books, 1992, pp. 129-130.]

http://www.teslaradio.com/pages/tesla.htm

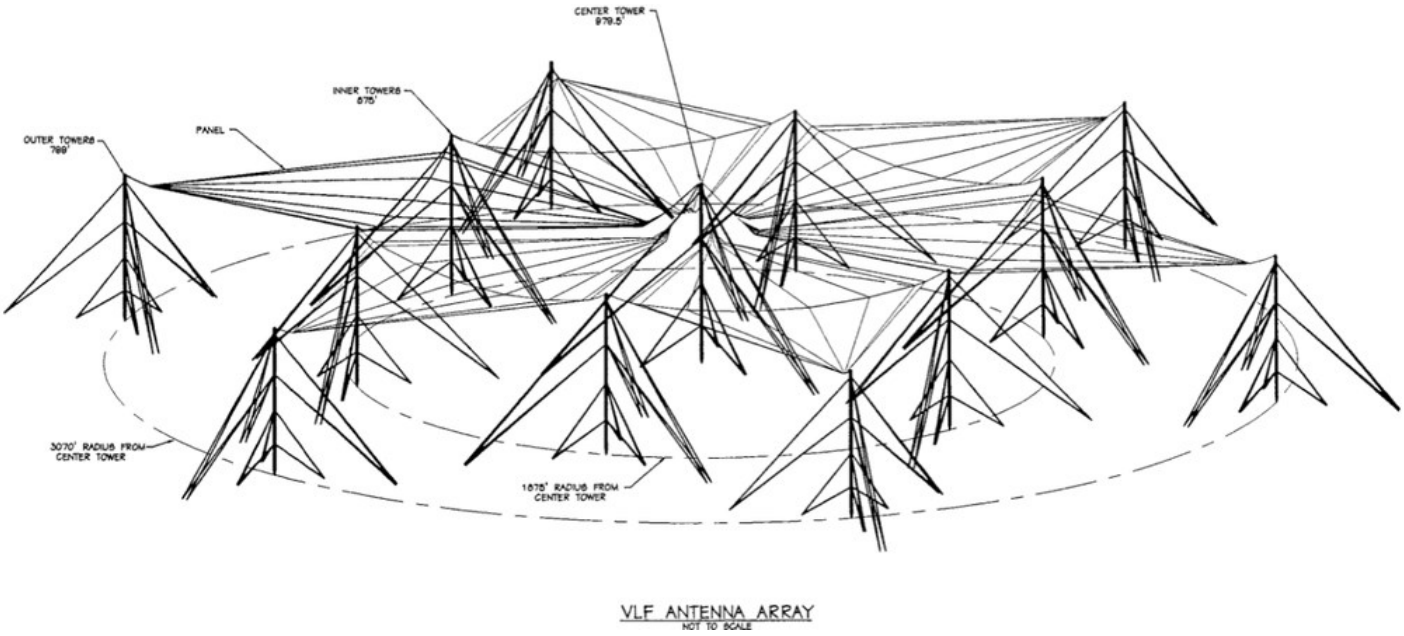
"The Tesla biographer John Joseph O'Neill noted the cupola at the top of the 186 foot tower had a 5-foot hole in its top where ultraviolet lights were to be mounted, ***perhaps to create an ionized path up through the atmosphere that could conduct electricity****.[22] How Tesla intended to employ the ground conduction method and atmospheric method in Wardenclyffe's design is unknown.[23] Power for the entire system was to be provided by a coal fired 200 kilowatt Westinghouse alternating current industrial generator."*

https://en.wikipedia.org/wiki/Wardenclyffe_Tower#The_plant_at_Wardenclyffe

HAARP

"The most prominent instrument at the HAARP Station is the Ionospheric Research Instrument (IRI), a high-power radio frequency transmitter facility operating in the high frequency(HF) band. The IRI is used to temporarily excite a limited area of the ionosphere. Other instruments, such as a VHF and a UHF radar, a fluxgate magnetometer, a digisonde (an ionospheric sounding device), and an induction magnetometer, were used to study the physical processes that occur in the excited region."

Very Low Frequencies



VLF ANTENNA ARRAY
NOT TO SCALE

"The main mode of long distance propagation is an Earth-ionosphere waveguide mechanism. The Earth is surrounded by a conductive layer of electrons and ions in the upper atmosphere, the ionosphere D layer at 60 km altitude,"

"Ionospheric reflection is a bending, through a complex process involving reflection and refraction, of electromagnetic waves propagating in the ionosphere back toward the Earth.

The amount of bending depends on the extent of penetration (which is a function of frequency), the angle of incidence, polarization of the wave, and ionospheric conditions, such as the ionization density. It is negatively affected by incidents of ionospheric absorption."

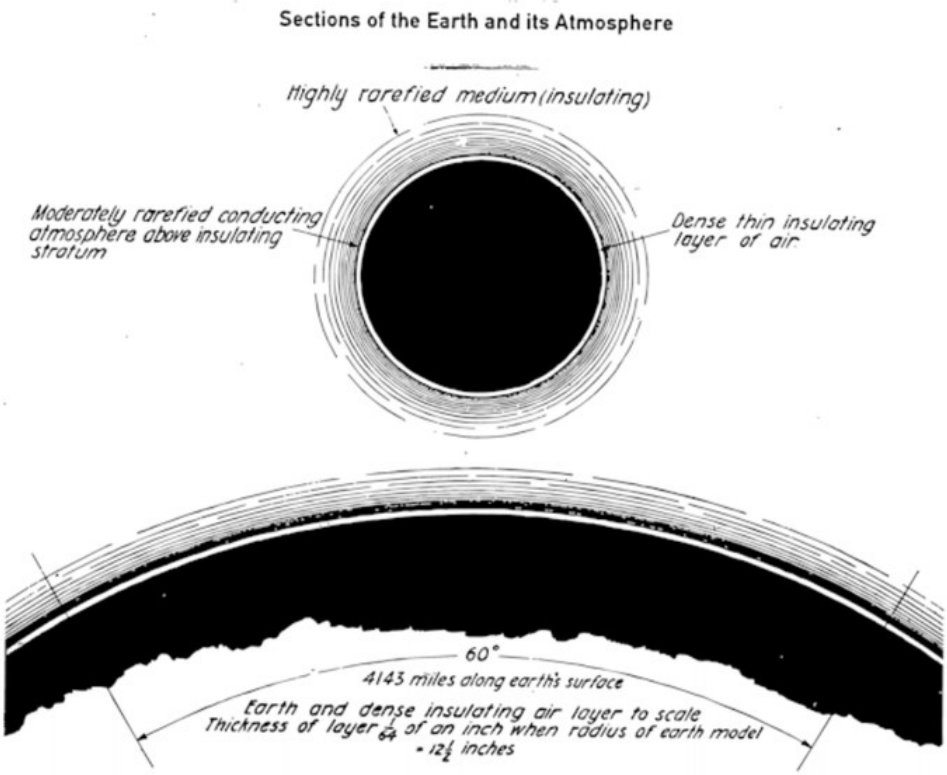
https://en.wikipedia.org/wiki/Ionospheric_reflection

https://en.wikipedia.org/wiki/Very_low_frequency

http://www.navy-radio.com/xmtr-vlf.htm

http://www.navy-radio.com/index.htm

http://www.navy-radio.com/commsta/cutler.htm



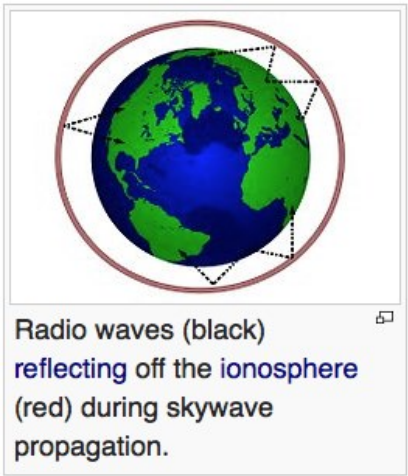
"The earth is 4,000 miles radius. Around this conducting earth is an atmosphere. The earth is a conductor; the atmosphere above is a conductor, only there is a little stratum between the conducting atmosphere and the conducting earth which is insulating. Now, on the basis of my experiments in my laboratory on Houston Street, the insulating layer of air, which separates the conducting layer of air from the conducting surface of the earth, is shown to scale as you see it here. Those [radii lines] are 60 of the circumference of the earth, and you may notice that faint white line, a little bit of a crack, that extends between those two conductors. Now, you realize right away that if you set up differences of potential at one point, say, you will create in the media corresponding fluctuations of potential. But, since the distance from the earth's surface to the conducting atmosphere is minute, as compared with the distance of the receiver at 4,000 miles, say, you can readily see that the energy cannot travel along this curve and get there, but will be immediately transformed into conduction currents, and these currents will travel like currents over a wire with a return. The energy will be recovered in the circuit, not by a beam that passes along this curve and is reflected and absorbed, because such a thing is impossible, but it will travel by conduction and will be recovered in this [emphasis in original] way. Had I drawn this white line to scale on the basis of my Colorado experiments, it would be so thin that you would have to use a magnifying glass to see it." Nikola Tesla

http://www.tfcbooks.com/tesla/nt_on_ac.htm

see also:

https://en.wikipedia.org/wiki/Vacuum_tube

https://archive.org/details/inventionsresear00martuoft



Radio waves (black) reflecting off the ionosphere (red) during skywave propagation.

SKYWAVE

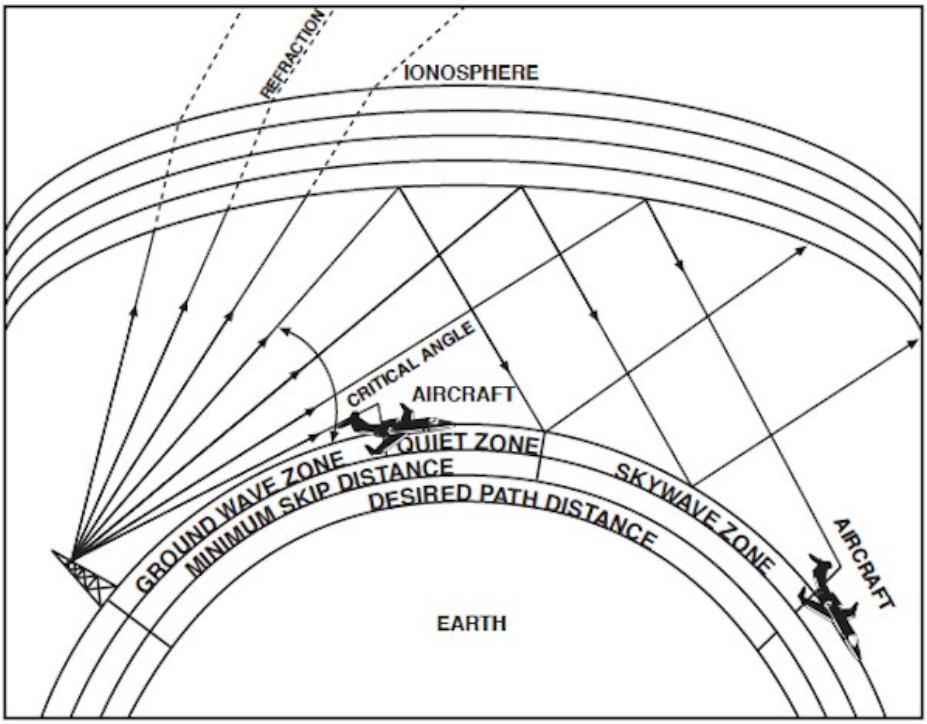
"In radio communication, **skywave** or **skip** refers to the propagation of radio waves reflected or refracted back toward Earth from the ionosphere, an electrically charged layer of the upper atmosphere. Since it is not limited by the curvature of the Earth, skywave propagation can be used to communicate

beyond the horizon, at intercontinental distances. It is mostly used in the shortwave frequency bands.

As a result of skywave propagation, a signal from a distant AM broadcasting station, a shortwave station, or—during sporadic E propagation conditions (principally during the summer months in both hemispheres)—a low frequency television station can sometimes be received as clearly as local stations. Most long-distance shortwave (high frequency) radio communication—between 3 and 30 MHz—is a result of skywave propagation. Since the early 1920s amateur radio operators(or "hams"), limited to lower transmitter power than broadcast stations, have taken advantage of skywave for long distance (or "DX") communication."

https://en.wikipedia.org/wiki/Skywave

GPS WITHOUT Satellites



see also: https://en.wikipedia.org/wiki/LORAN#Basic_concept

https://en.wikipedia.org/wiki/Hyperbolic_navigation

https://en.wikipedia.org/wiki/Satellite_television

https://en.wikipedia.org/wiki/MPEG-1

Support Eric Dollard - join for free: http://ericpdollard.com - History of the Marconi RCA Station Bolinas California - see Wireless Giant of the Pacific on the website listed here for more info on the most updated release.

"How do the signals travel? How are frequency bands chosen? What's special about geostationary orbit? How are the orbital locations of the satellites regulated?

A communications satellite works like a relay station: signals transmitted by the ground stations are picked up by the satellite's receiver antennas, the signals are filtered, their frequency changed and amplified, and then routed via the transmit antennas back down to Earth. In some cases the signal is first processed by digital computers on board the satellite, as for example for highly specific missions such as Inmarsat-4 or Skynet 5. ***Most satellites, however, are 'transparent', in that they retransmit the signal without modifying it – their role is simply to deliver the signal exactly to where it is required."***

http://www.space-airbusds.com/en/news2/do-you-know-how-a-communications-satellite-works.html

Why is the uplink frequency higher than the downlink frequency in satellite communication?

"**Prasanta kumar Pradhan** · Sree Vidyanikethan Engineering College

Well, what you mean by uplink and downlink depends on the type of communication you are referring to. Here, I am going to discuss about two major domains- satellite communication (satcomm) and mobile communication (mobcomm).

satcomm: downlink- signal from earth base station to satellite

uplink- signal from satellite back to earth

mobcomm: downlink: signal from base station to mobile station (cellphone)

uplink: signal from mobile station(cellphone) to base station

Now, as would have thought, separate frequency bands are always allocated for uplink and downlink signals, often separated by a gap (maybe for future allocation, since the span of 'guard bands' are relatively very less compared to the actual information-carrying bands, e.g., 100 KHz guard bands in case of GSM-900, where the uplink and downlink bands span 25 MHz each).

The main question that this article will be answering is pretty simple: If you observe the uplink and downlink channels carefully, you would notice that the uplink frequencies are higher than the corresponding downlink frequencies in the case of satcomm, whether in the case of mobcomm, it's just the reverse.

satcomm: C-band : U/L-6 GHz, D/L-4 GHz

Ku band: U/L-14 GHz, D/L-12 GHz

mobcomm: GSM-900: U/L-890-915 MHz, D/L- 935-960 MHz

GSM-1800: U/L-1710-1785 MHz, D/L- 1805-1880 MHz

WHY IS THAT SO?

The answer is simple too. It's all about power considerations.

In satcomm, the signals have to cross the atmosphere which presents a great deal of attenuation. The higher the frequency, the more is the signal loss and more power is needed for reliable transmission.

So now you would say why use higher frequencies if signal loss is more and you need more power? It's because lower frequencies get reflected by atmospheric bands and cannot penetrate to get through to the satellite.

Now, a satellite is a light-weight device which cannot support high-power transmitters on it. So, it transmits at a lower frequency (higher the frequency, higher is the transmitter power to accommodate losses) as compared to the stationary earth station which can afford to use very high-power transmitters. This is compensated by using highly sensitive receiver circuits on the earth station which is in the line-of-sight (LOS) of the satellite.

In mobcomm, a similar point holds. A mobile is a portable device which cannot afford high-power transmission as it has a small battery with limited power. The 'free space path loss' comes to play. The higher the transmitting frequency, the higher is the loss. Since a mobile station (cellphone) cannot afford to transmit at high power to compensate for this loss, it must transmit on a lower frequency as a lower frequency presents lesser free space path loss. Therefore, mobile-to-base station (uplink) frequencies are lower than base station-to-mobile(downlink) frequencies.

https://in.answers.yahoo.com/question/index?qid=20140318234608AAkJrYV”

https://www.researchgate.net/post/Why_is_the_uplink_frequency_higher_than_the_downlink_frequency_in_satellite_communication

"Under normal conditions, a signal that is not blocked or obstructed simply travels in a straight line out into space, never to return to Earth again. However, various atmospheric conditions often cause the normal path of FM and TV signals to be bent downward, returning the signal to the surface of the Earth, sometimes a great distance from its point of origin."

"***Meteor Scatter*** - This interesting form of enhancement results from signals bouncing off of the intensely ionized trails of meteors entering and"burning up" in the E region of the ionosphere. The strength and duration of meteor scatter signals decreases with increasing frequency. Thus, the effect is much more pronounced at the lower FM band frequencies than at the upper end of the band. Meteor scatter can be heard anywhere, anytime of the day or night. However, bursts are more plentiful around dawn, and during known major meteor showers. "

http://www.dxfm.com/content/propagation.htm

CLICK HERE FOR MORE

see also: https://en.wikipedia.org/wiki/Ernst_Alexanderson

source:

https://en.wikipedia.org/wiki/Skywave

http://www.school-for-champions.com/science/gravity_newtons_cannon.htm#.VtaH_hEryp4

http://lakdiva.org/clarke/1945ww/

https://en.wikipedia.org/wiki/International_Space_Station

https://en.wikipedia.org/wiki/Celestial_mechanics

https://archive.org/details/newtonspmathema00newtrich

http://www.argonauts-book.com/isaac-newton.html

https://en.wikipedia.org/wiki/Orbital_speed

http://math.ucr.edu/home/baez/physics/General/Centrifugal/centri.html

https://en.wikipedia.org/wiki/Isaac_Newton

https://en.wikipedia.org/wiki/Newton%27s_theorem_of_revolving_orbits

https://en.wikipedia.org/wiki/Time_derivative

epilogue: Einstein vs Newton

General Relativity is an Ether Theory: A Gravitational Ether Theory, by Einstein's own admission.

Albert Einstein, 1920 Gravitational Ether Speech

"What is fundamentally new in the ether of the general theory of relativity as opposed to the ether of Lorentz consists in this, that the state of the former is at every place determined by connections with the matter and the state of the ether in neighbouring places, which are amenable to law in the form of differential equations; whereas the state of the Lorentzian ether in the absence of electromagnetic fields is conditioned by nothing outside itself, and is everywhere the same. The ether of the general theory of relativity is transmuted conceptually into the ether of Lorentz if we substitute constants for the functions of space which describe the former, disregarding the causes which condition its state. Thus we may also say, I think, that the ether of the general theory of relativity is the outcome of the Lorentzian ether, through relativation.

As to the part which the new ether is to play in the physics of the future we are not yet clear. We know that it determines the metrical relations in the space-time continuum, e.g. the configurative possibilities of solid bodies as well as the gravitational fields; but we do not know whether it has an essential share in the structure of the electrical elementary particles constituting matter. Nor do we know whether it is only in the proximity of ponderable masses that its structure differs essentially from that of the Lorentzian ether; whether the geometry of spaces of cosmic extent is approximately Euclidean. But we can assert by reason of the relativistic equations of gravitation that there must be a departure from Euclidean relations, with spaces of cosmic order of magnitude, if there exists a positive mean density, no matter how small, of the matter in the universe.

In this case the universe must of necessity be spatially unbounded and of finite magnitude, its magnitude being determined by the value of that mean density.

If we consider the gravitational field and the electromagnetic field from the standpoint of the ether hypothesis, we find a remarkable difference between the two. There can be no space nor any part of space without gravitational potentials; for these confer upon space its metrical qualities, without which it cannot be imagined at all. The existence of the gravitational field is inseparably bound up with the existence of space. On the other hand a part of space may very well be imagined without an electromagnetic field; thus in contrast with the gravitational field, the electromagnetic field seems to be only secondarily linked to the ether, the formal nature of the electromagnetic field being as yet in no way determined by that of gravitational ether. From the

present state of theory it looks as if the electromagnetic field, as opposed to the gravitational field, rests upon an entirely new formal motif, as though nature might just as well have endowed the gravitational ether with fields of quite another type, for example, with fields of a scalar potential, instead of fields of the electromagnetic type.

Since according to our present conceptions the elementary particles of matter are also, in their essence, nothing else than condensations of the electromagnetic field, our present view of the universe presents two realities which are completely separated from each other conceptually, although connected causally, namely, **gravitational ether** and electromagnetic field, or - as they might also be called - space and matter.

Of course it would be a great advance if we could succeed in comprehending the gravitational field and the electromagnetic field together as one unified conformation. Then for the first time the epoch of theoretical physics founded by Faraday and Maxwell would reach a satisfactory conclusion. The contrast between ether and matter would fade away, and, through the general theory of relativity, the whole of physics would become a complete system of thought, like geometry, kinematics, and the theory of gravitation. An exceedingly ingenious attempt in this direction has been made by the mathematician H Weyl; but I do not believe that his theory will hold its ground in relation to reality. Further, in contemplating the immediate future of theoretical physics we ought not unconditionally to reject the possibility that the facts comprised in the quantum theory may set bounds to the field theory beyond which it cannot pass.

Recapitulating, we may say that according to the general theory of relativity space is endowed with physical qualities; in this sense, therefore, there exists an ether. According to the general theory of relativity space without ether is unthinkable; for in such space there not only would be no propagation of light, but also no possibility of existence for standards of space and time (measuring-rods and clocks), nor therefore any space-time intervals in the physical sense. But this ether may not be thought of as endowed with the quality characteristic of ponderable media, as consisting of parts which may be tracked through time. The idea of motion may not be applied to it."

What Is Gravity? Newton Vs Einstein. From PBS

Science and Technology in World History, Volume 3: The Black Death, the ...By David Deming

The most interesting part of the *Principia* is the *General Scholium* which appears at the very end of the book.* After having conclusively demonstrated that the universe behaves like a machine, obedient to invariant natural law, Newton affirmed his belief in a personal God. He argued that "this most beautiful system of the Sun, planets and comets, could only proceed from the counsel and dominion of an intelligent and powerful being … the true God is a living, intelligent and powerful being … He is eternal and infinite, omnipotent and omniscient; that is, his duration reaches from eternity to eternity; his presence from infinity to infinity; he governs all things, and knows all things that are or can be done."[772]

Newton was no deist. He believed that God is an intelligent and purposeful Being intimately involved with managing the affairs of men and the universe. Newton's God was not nature, nor was it an abstract spiritual entity that had set the universe into initial motion like a clockmaker that constructs his machine, winds it, and then lets it run on its own. "We adore him [God] as his servants; and a God without dominion, providence, and final causes, is nothing else but fate and nature."[773]

In his popular exposition of Newton's philosophy, Voltaire described Newton's conception of the Deity. "Sir Isaac Newton was firmly persuaded of the existence of a God; by which he understood not only an infinite, omnipotent, eternal, and creating Being, but moreover a Master, who has made a relation between himself and his creatures; for the knowledge of a God without such relation is a mere barren idea, which leaves human nature destitute of morality and virtue."[774]

To Newton, the discovery that the universe was governed by natural law was evidence for the existence of God. Study of nature through science was a window, albeit a narrow

*The *General Scholium* first appeared in the second edition of the *Principia* in 1713. For the sake of conciseness, my discussion of the *Principia* and quotations are drawn from the English translation of the third edition that was published in 1729.

These discrepancies suggest that there must be some other mass out there.

The mathematical complexities of deciphering the orbits of Uranus and Neptune, however, pale in comparison with those arising from the motion of our own familiar moon. It was in the moon's astonishingly complicated movements that astronomers first glimpsed dynamical chaos and truly began to learn the limits of mathematical prediction.

The Fix is In: The Problem with The Fixed Stars

Problems with the Fixed Stars:

The Zodiac and other Constellations have been apparently known for ages.These shapes ate not supposed to have changed since the time of ancient civilizations, or so we are told. We forget there is a difference between the Big Bang Theory Universe model and the Heliocentric Universe model.

The visual evidence shows us that the Fixed Stars would have to all be the same distance from the Earth which seems to be impossible with a BIG BANG THEORY Type model.

The Earth Moves From One Side of The Solar System to the Other and the Constellations retain their shapes and respective distances from each other.

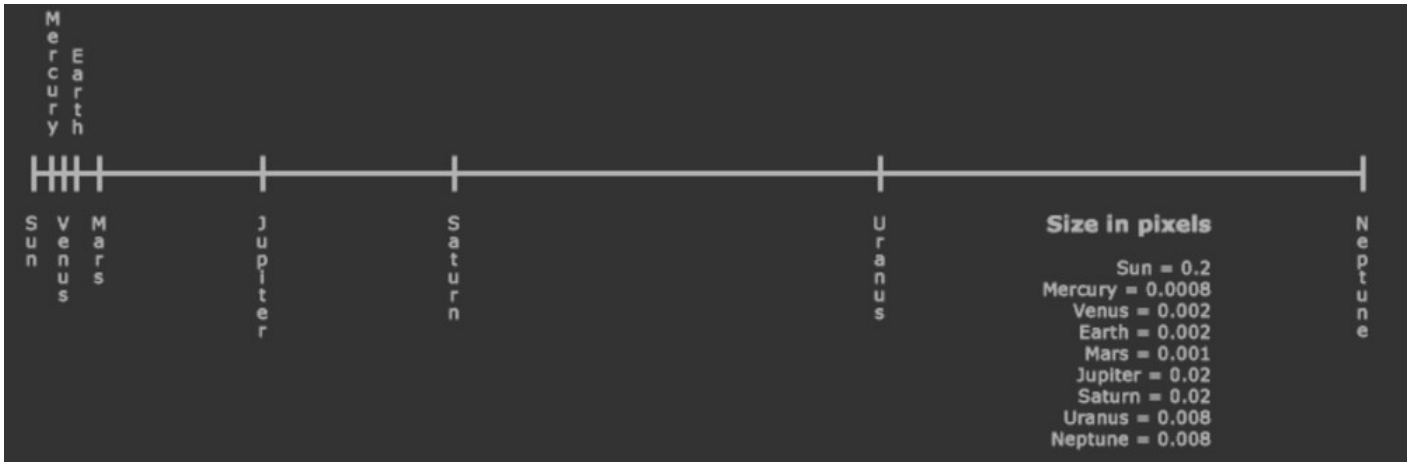
If the third rock from our sun is some 92 Sun diameters from the Sun, how could there possibly be any planets around the stars which are closer together than that? What about the distance of (former) planets like Pluto, *(or any of the other planets in between?*) which are supposed to be that many time further out from our Sun? This will be explored further, in a future article, with both the language and the concept fleshed out in a clear and precise manner.

The evidence suggests a geocentric Ptolemaic model of the Cosmos is the one that best describes "Mother" Nature.

Please Read some of the other entries here to see what we mean.

In1974 Arthur C. Clarke told the ABC that every household in 2001 will have a computer and be connected all over the world. Courtesy of Australian Broadcasting Corporation.

Compare the distance of the planets from the Sun to the distance between the “Fixed Stars”. Compare the proportions and please take notice that the constellations never change shape as the Earth is supposed to go from one side of the solar system to the other This is not what we’d expect in a three dimensional “big Bang “ explosive type Universe. Notice how far away the planets are in terms of sun diameters and compare to where they would be in the heavens if the stars were Suns with planets like ours. The planets would be effected by the gravity of the other Suns. They are all visually too close together and the stars are not visually far enough apart to allow for those stars to be Suns with planets, according to the model of the heliocentric Solar System and the imagined distance to the planets. Modern science is a patchwork of illogic. We have to believe the mainstream explanation that is based on the house of cards in the first place. This is an example of circular reasoning. The mainstream model with its distances based on all prior assumptions is nonsense and nothing more. We have to check our eyes and mind at the door to accept the authority of the mainstream propaganda system.



Distance of the Planets From Our Sun

"Three years ago, for my granddaughter’s science fair project, she wanted to do the “walkable scale solar system”, so we went online and found the “Earth as a peppercorn” article (just google it) and decided to do that… “…but Abu! I want to do the Earth as a marble!” she said, so “no problem” says I, as I get the calipers, calculator and a notepad to do the conversion. For 6th graders… not so walkable anymore. We placed an 8’ diameter round carpet on the floor of the auditorium to serve as our Sun (2.5m across), in the center of which was our scale

display, along with take-away pamphlets explaining the actual distances and scales involved, along with where to find the planets, either linearly (along state road #1) or as a current model (with planets in actual relative positions. Linearly, we posted water-resistant posterboard signs on the side of the road along the route from San Juan towards Caguas (fudging a bit so that a car could safely park to get out and read the signs).

The Route:

Sun - 2.5 m dia. (8')

Mercury - 8.7 mm - 105 m

Venus - 2.2 cm - 195 m

Earth - 2.3 cm (1") - 270 m (1 AU)

-Moon - 6 mm (about ¼")- 70 cm (about 28") from Earth

Mars - 1.2 cm - 412 m

Asteroid Belt - 2 mm (ground to dust) - 540-945 m

Jupiter - 25 cm (about the size of a basketball)- 1.4 km

Saturn (planet) - 21 cm (about the size of a volleyball) (+ rings - 45 cm across) - 2.6 km

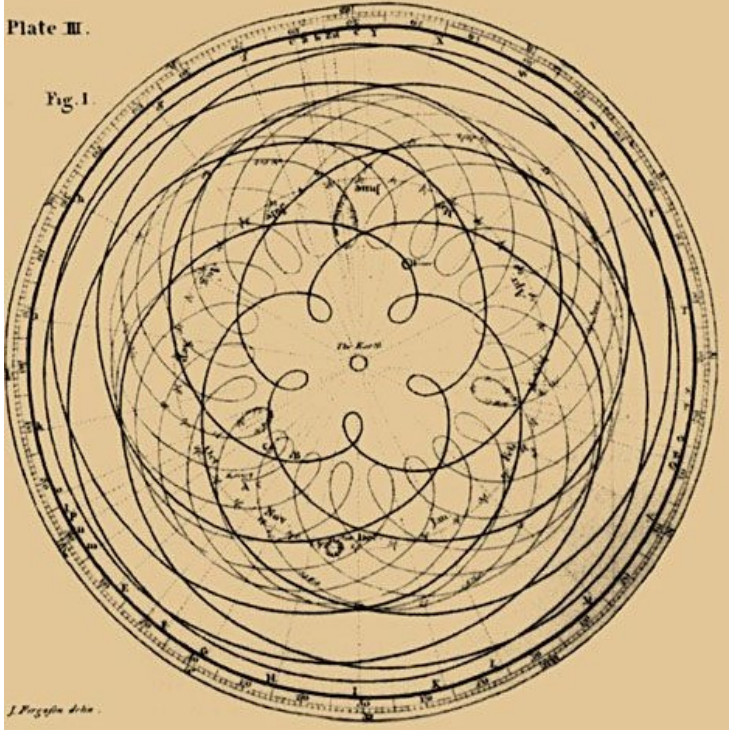
Uranus - 9.1 cm (slightly smaller than a softball) - 5.2 km

Neptune - 8.9 cm (slightly smaller than a softball) - 8.1 km

Pluto/Eris/Kuiper Belt – 1 mm / 1 mm / packet of restaurant salt - 8-15 km"

http://countschlick.deviantart.com/art/The-Solar-System-to-Scale-340460688

SEE ALSO :https://www.youtube.com/watch?v=CZkL9ufF3Kc



https://en.wikipedia.org/wiki/Geocentric_model#Ptolemaic_model

Early Cosmology Explained- please Listen

This is the story of the 3 successive stages of the "Philosophic Life" which almost all of us live. Some of us live it consciously, others, not so much. Gene's story is one of good fortune.

Fakin' The Space Station

Please notice that the International Space Station is supposed to orbit the Earth once every 90 minutes. Please notice too that according to the official material, below, you can only see the International Space Station twice a night, instead of every 90 minutes during the night as would be expected if this was a real object in a real orbit as they claim. You should be able to see the same white blob of light appear in the sky every 90 minutes.

NASA is a propaganda outfit designed for the television age using Hollywood Special Effects. The medium for the proverbial “Matrix” was and is video documentary and news. Both are propaganda more so than not.

Newton’s concept of orbital mechanics is flawed and wrong. Gravity is an accelerated phenomena and Newton’s imagined inertia is set at a fixed velocity. One cannot permanently balance the other. Energy would have to be continuously and magically added to the object and a medium would be needed to

enable any body to achieve anything like the imagined orbit of Newton.
If A increases forever, and B=3, A cannot always equal B.

This is just like a brain teaser.

Can you pick out the other problems and contradictions in the material presented below?

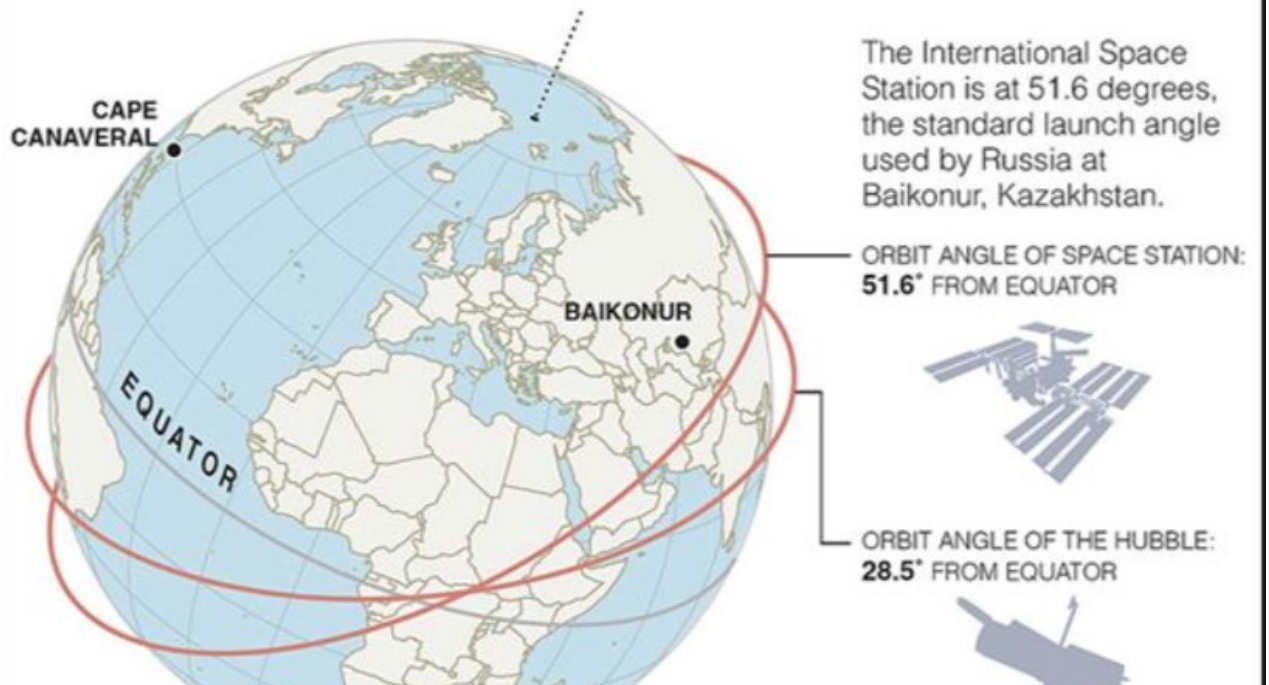
International Space Station / Speed on orbit

4.76 miles/s

The International Space Station travels in orbit around Earth at a speed of roughly **17,150 miles per hour** (that's **about 5 miles per second**!). This means that the Space Station orbits Earth (and sees a sunrise) once every 92 minutes!

How fast does the Space Station travel? | Cool Cosmos
coolcosmos.ipac.caltech.edu/.../282-How-fast-does-the... California Institute of Technology

IT'S ROCKET SCIENCE Once an object is launched into orbit, changing the angle at which it crosses the Equator is very difficult. The Hubble Space Telescope was launched at 28.5 degrees, the easiest angle possible from Cape Canaveral, Fla. Launching at low angles minimizes the amount of rocket thrust needed to achieve orbit.



Sighting Location

Location: New York, New York, United States

Sign Up for Alerts now! | RSS | Bookmark | Share | Print

The following ISS sightings are possible from Friday May 13, 2016 through Saturday May 28, 2016

Date	Visible	Max Height	Appears	Disappears	Share Event
Sat May 14, 2:35 AM	< 1 min	13°	13° above E	11° above E	
Sat May 14, 4:07 AM	3 min	36°	23° above WNW	25° above NNE	
Sun May 15, 3:17 AM	1 min	54°	54° above NNE	28° above NE	
Sun May 15, 4:51 AM	3 min	16°	11° above NW	13° above NNE	
Mon May 16, 2:26 AM	1 min	18°	18° above ENE	10° above ENE	
Mon May 16, 3:58 AM	3 min	21°	14° above WNW	17° above N	
Tue May 17, 3:07 AM	1 min	31°	31° above NNW	22° above NNE	
Tue May 17, 4:43 AM	3 min	13°	10° above NW	11° above NNE	
Wed May 18, 2:16 AM	< 1 min	22°	22° above NE	15° above NE	
Wed May 18, 3:50 AM	3 min	15°	10° above NW	14° above N	
Thu May 19, 2:58 AM	2 min	19°	18° above NW	17° above N	
Thu May 19, 4:35 AM	2 min	12°	10° above NNW	12° above N	
Fri May 20, 2:07 AM	< 1 min	22°	22° above N	20° above NNE	
Fri May 20, 3:42 AM	2 min	12°	10° above NNW	12° above N	
Sat May 21, 1:16 AM	< 1 min	11°	11° above NE	11° above NE	
Sat May 21, 2:49 AM	2 min	14°	11° above NW	14° above N	

Tags: science, fact, fiction, NASA, hoax, International Space Station, Skylab, Hollywood, special effect, Wernher von Braun, Disney, history, World War Two, v2, rockets, fake, orbit, Arthur C. Clarke, Kepler, Newton, flawed, NASA Sky Lab, Sky Lab, Special Effects, V2 Hoax, V2 Rockets, V2, V2 Rocket Hoax, V2 Missile, Missile Hoax, Golden Fleece, argonauts, Sir Isaac Newton, precession, equnioxes, myth, HIstory, science fiction, history of sic fi, history of sci fi, history of science fiction., Tesla, Nikola Tesla, HAARP, rockets in vacuum, rockets don't work in a vacuum, rocket's do not work in a vacuum, vacuum, Sir Isaac Newton Gravity Theory, Isaac Newton, gravity, apple, physics, metaphysics and physics, metaphysics, Coriolis force, Coriolis, NASA Sky Lab Space Station, von Braun, missiles, v2 rockets, v2 hoax, space, astronaut, science fiction and fantasy, Artificial Satellites, Satellites, Arthur C. Clarke & 2001, Ionospheric reflection, marconi, tesla

November 2, 2015